Best medical care practices in sport: investigating the barriers to the implementation in the developing countries.
Uganda as a case study

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DECLARATION

PhD THESIS TITLE:

Best medical care practices in sport: investigating the barriers to the implementation process in the developing countries. Uganda as a case study

I, Samuel Lubega, I hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements are indicated otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other University. Portions of this thesis have however been published in form of articles in sports medicine journals or presented at sports medicine conferences both locally and internationally.

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Samuel Lubega Date

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THE ABSTRACT

The dissertation consists of four separate studies that have focused on different aspects of the relationship between the management of sports related injuries and utilisation of best practices before sports, during sports and after sports-related injuries.

Background: Participation in sports has an associated risk of injury which is defined by the type of sport and level of participation. Any injury affects the athletes' health status. To mitigate this risk, international sporting organizations provide guidelines, and mandates the proper evaluation and care for athletes before, during and after training or participation in competition. Despite the availability of guidelines describing best medical care practices for managing athletes, inappropriate management practices are reported globally. The barriers to best medical practice vary. While these barriers have been investigated in a variety of sports in developed countries, similar investigations have not been extensively conducted in developing countries, where the demands are different. Therefore, the overall aim of this thesis was to explore barriers to best medical practices in a variety of sports in Uganda.

Methodology: The research was conducted as four studies. The first study used a descriptive case study approach. The data were collected on a sample of injured athletes (n=75) from four sports in Uganda (football/soccer, athletics, basketball and rugby) to describe the medical care practices of the sports resource providers. The current prevention, emergency care, intermediate treatment, rehabilitation services and return-to-sports strategies were all documented in a period of six months. The gaps in best practices were observed, and further investigated in the next three studies. Firstly, a validated questionnaire was used to establish the level of knowledge and practices of various components/themes of athletes' well-being and best practices among the stakeholders. Secondly, the current standards of the sports arenas and medical and high-performance facilities were examined using a validated checklist. The last study was a semi-structured interview which assessed the available national health care policies to support sports best practice strategies in Uganda

Findings: The overall results of the first study showed there was a significant lack of compliance to best medical care practices in all the phases of athletes' health care. The barriers to best practice were confirmed as: (i) the lack of adequate knowledge and awareness on various best practice strategies, (ii) the sports and health facilities were below the required standards and, (iii) there were no national health sports care policies to support and facilitate the implementation of best practices in Uganda.

Conclusion: (i) A holistic approach may be required to address the best medical care practice barriers in Uganda to improve on the health and safety of athletes. (ii) The knowledge of stakeholders should be improved and awareness created about best medical practices in sports in Uganda. (iii) There is a critical need to develop a national sports health care policy. (iv) The facilities for sports and health care of athletes urgently need improvement and supported.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Globally, the popularity of sports activities has increased. Currently the four major sports: athletics, basketball, football and rugby union have more member organisations compared to three decades ago (FIBA, 2019; IAAF, 2019; FIFA, 2019, World Rugby, 2019, & Rugby Union members, 2019). The increase in the number of country affiliations to international sports bodies is directly associated with increased number of athletes at all the levels of participation in a given sporting code. It follows that increased sports participation is associated with more sports related injuries (Pfirrmann et al., 2016). Indeed, epidemiological studies have confirmed the increase in the prevalence and incidence of sports-related injuries at all levels of participation (Drew & Finch, 2016; Moore, Ranson, & Mathema, 2015; Pfiimanna et al., 2016). The injuries are associated with training and performing at a high level (Drew & Finch, 2016; D'Souza, 1994; Ekstrand, Haggund, & Walden, 2009; Gabbett, 2016). Typical adverse conditions associated with participation in sport include: the cardiac arrest, concussion, fractures, strain and sprains (Bleakley, Tully, & O'Connor, 2011; Freitag, Kirkwood, & Pollock, 2015; Kirkwood, Parekhan, Otori-Asenso, & Pollock, 2015; Moore, Ranson & Mathema, 2015; Hui-Lui et al., 2012; Solberg et al., 2016).

The nature of these injuries varies across the sporting codes. For example, in rugby concussions, shoulder dislocations, fractures, spine catastrophic injuries, ankle and knee sprains, and hamstring strains are a major concern (Burger et al., 2014; Fuller, Sheen, & Target, 2013; Jakoet & Noakes, 1995; McIntosh & Savage, 2006; Moore, Ranson & Mathema, 2015; Robertson et al., 2014; William, Trewarth, Kemp, & Stoke, 2013). In football contusion, sprains & strains, concussion, fractures and skin lesions are the most frequent injuries (Junge & Dvorak, 2013). In athletics, the common injuries are strains and sprains, contusion and overuse injuries (Palmer & Elliott, 2015), and in basketball athletes get mostly (60%) lower extremity injuries (Garbenytė-Apolinskienė et al., 2019). Also, the pattern of the injuries across the sports is different in youth compared to adults (Abernethy & Bleakley, 2007).

Previous studies have included the intrinsic factor (athlete's health status) as a major risk for the various serious or even fatal sports related injuries (Abernethy & Bleakley, 2007;

Ekstrand, Hagglund, & Walden, 2009; Junge & Dvorak, 2015; Ibikundle, Ani, Useh, & Akosile, 2014; McCall et al., 2015; Quarrie et al., 2001). For example, an athlete participating in a sports event without the support of proper and adequate medical care may get injured and then return-to-sport participation before the injury has healed. This increases the risk of further and subsequent injury (Hagglund, Walden, & Ekstrand, 2006). Heyworth et al. (2016) showed that inappropriate and inadequate management of the young athlete's musculoskeletal problems caused recurrent symptoms of pain and subsequent injuries. Likewise, a first concussion injury, if not rehabilitated fully, may increase the risk of a subsequent injury of any type at any location when the athlete resumes participation (Brooks et al., 2016; Burman et al., 2016; Ekstrand, Hagglund, & Walden, 2009; Fuller & Walker, 2006; Moore, Ranson, & Mathema, 2015; Savage, 2013).

Best medical practice includes prevention and management of athletes' health and illness. Promoting the best medical practice principles *before*, *during* and *after participation* in any sport is a main goal of international sports medical boards. In accordance with this goal, the medical support staff of teams need to be well trained so they can adopt strategies to prevent, and manage injuries adequately and appropriately for the athlete to return to play without an increased risk of further injury (Beardmor et al., 2004; Casa et al., 2012; D`Souza, 1994; Dvorak et al., 2013; Gawronski, Sobiecka & Malesza, 2013; Ljungjvist, 2009; Khuran & Kaye, 2012; McCrory et al., 2012; Thiel et al., 2011). The service providers and policy makers associated with the sport also need to be well-informed about injuries and return-to-play policies so that they are aligned with the decisions of the medical support staff. And to complete the principles of best practice, the facilities such as hospitals, gymnasia and training fields must be adequately resourced so the needs of the athletes are fully met.

1.2 THE RESEARCH FOCUS OF THIS THESIS

There are several documents on player welfare in the public domain produced by international sports bodies, European and American medical organisations. For example, there are policy-guidelines about the strategies to prevent and manage sports related injuries on the websites of major sports bodies (IAAF, 2019; IOC, 2019, FIFA, 2019, and World Rugby, 2019). The policy-guidelines are also published as sports medical, and scientific journals. The International Olympic Committee (IOC) medical commission also has guidelines for reducing doping (IOC Medical Commission, 2013). The International Association of Athletics Federations (IAAF) medical manual (IAAF-Medical manual, 2012)

has guidelines for protection and management of player's health; there is extensive literature about player's welfare on the World Rugby website (World Rugby, 2019). Also Fédération Internationale de Football Association (FIFA) offers an online sports medical diploma course (FIFA Medical Assessment and Research Centre or F-MARC). The International Olympic Education Commission and World Rugby have also online-courses on pre-participation evaluation, emergency care, intermediate care to return-to-sports s best practice resources (IOC Medical and Scientific committee, 2019; World Rugby Player's welfare, 2019). Further, the four international sporting codes for athletics (IAAF), basketball (FIBA), Football (FIFA) and rugby (WR) have requirements, and policy-guidelines necessary for sports facilities geared for athlete's injury and illness prevention. These are published either on their websites or in form of manuals.

In summary, there is much information to ensure and support the well-being of athletes at all levels of participation. An underlying assumption is that the uptake of this information is good and practical. While there is evidence to support this assumption in some countries (Hedman et al., 2018), it cannot be assumed that the uptake is universal, particularly in developing countries faced with financial challenges (Ekstrand, Hägglund & Waldén, 2011). A paradox is that many high-level sports participants are from developing countries. Using Uganda as an example of a developing country, in 1972 a Ugandan athlete won the country's first record gold medal in the 400m steeplechase hurdle in the Olympic Games held in Munich Germany. In the last three decades, Uganda has collected several medals in world events, and currently Ugandan athletes hold the world mountain running championship, IOC and IAAF marathons gold medals (UNCS, 2019). In other sports such as sevens rugby, women's netball, women's rugby and football sport, Uganda's position on the continent is highly competitive.

Despite Uganda's rich history in international and continental events since 1956, there are no published studies on the sports medical practices assocaited with different sports. Indeed, there is no evidence that the policy guidelines for managing the health of athletes, as recommended by international sporting bodies are being practiced.

1.3 STATEMENT OF THE PROBLEM

Literature on the evaluation of the principles of best medical practice in sport is limited. The evaluation studies of the implemented best practice principles are either field-based (Guskiewicz & Broglio, 2015) or hospital based (Howard et al., 2014). These studies

have mainly evaluated injuries and illnesses (Alonso et al., 2009; Junge & Dvorak, 2014), lifestyle challenges among athletes (Breslin et al., 2019), concussion and other injury management (Carney et al., 2014; Karr, Areshenkoff & Garcia-Barrera, 2014; Haran et al., 2015; Tator, 2008).

Studies evaluating best practices have been implemented in several countries outside Africa. For example, the evaluation of pre-participation health protocols compliance, and laws prohibiting athletes from continued participation after an injury in the USA (Opar et al., 2015; Roos et al., 2017), Brazil (Netto et al., 2019), and Finland (Toivo et al., 2018). Further studies evaluating principles of best practice have been conducted in Australia (Huxley, O'connor & Healey, 2014), New Zealand (Freitag, Kirkwood & Pollock, 2015; Schneiders, Takemira & Wassinger, 2009), Japan (Okuwaki, 2015) and North Korea (Yang et al., 2016). The studies from high income countries have revealed a substancial amount of inadequacy not only in the skills of service providers, but also in the sports and health facility standards, and sports health care policies (Briggs et al., 2019).

In Uganda, the poor implementation or lack therefore of best medical care practices in sports has not been assessed. There is limited guidance to the government on how to deliver best practices in sports to improve the health of athletes. There is a strong likelihood that a developing country such as Uganda has unique challenges in applying the principles of best medical practice in sport. In order to clearly understand the magnitude of this problem, this investigation considered the four major sports as evidenced by Uganda's National Council of Sports (NCS) Report (NCS, 2018). These sports have registered the most number of participants in annual competitions and events

1.4 AIM OF THE THESIS

The aim of this thesis was to identify barriers to the implementation and adherence to the best medical care principles in sport in Uganda.

1.5 QUESTIONS OF THE THESIS

1) What are medical practice principle guidelines which health workers in Uganda use to prevent, and manage injured athletes?

2) What is the level of the knowledge and practice on the best practice principles among the Ugandan sports resource providers?

3) What is the state and quality of the various facilities (sports, medical and high performance) in Uganda which service injured athletes?

4) Are there constitutional laws or policies encouraging injury prevention and appropriate medical care for athletes?

1.6 THE OBJECTIVES OF THE THESIS WERE:

1) To observe and document the prevention and management strategies of injured athletes in Uganda (Chapter Three)

2) To establish the level of knowledge and practices of best practice principles among the sports resource providers (Chapter Four)

3) To assess the situation and status of the various facilities (sports, medical and high performance) in Uganda which service injured athletes (Chapter Five)

4) To assess the national sports health care policy documents that are in use for supporting the health service delivery to the Uganda athletes (Chapter Six)

The literature relevant to these studies will be presented in the next section (Chapter Two). This will be followed by a description of each study designed to answer the questions outlined above. Further, each subsequent chapter (Chapters Three, Four, Five and Six) will present experimental evidence and will be followed by a summary and conclusion section, in an attempt to answer the question associated with each study. Then Chapter Seven will discuss the four studies. Chapter 8 will present overall summary of the discussion from the four studies. Any recommendations arising from these studies will be made again in this section.

‘

THESIS STRUCTURE

1. **Chapter Two: review of the literature**:

2. **Chapter Three**:

The management strategies currently used to service injured athletes in Uganda

3. **Chapter Four:**

The knowledge and practice levels among the sports resource providers, with regards to the well-being and best medical care practices in sports in Uganda

4. **Chapter Five:**

The state of sports and medical facilities, including rehabilitation facilities used to service athletes; before, during and after injuries

5. **Chapter Six:**

The available national sports health care policies and human resource personal to support the development and implementation of the best medical care strategies.

6. **Chapter Seven:**

The summary of the four studies

7. **Chapter Eight**:

This chapter will provide the summary, and conclusion of the four studies and the practical implication and recommendations.

CHAPTER 2

LITERATURE REVIEW: SPORTS BODIES, ATHLETES' WELL-BEING AND BEST PRACTICE PRINCIPLES.

2.1 GENERAL INTRODUCTION

This literature review demonstrates the diverse parts representing the dissimilar research areas in the present PhD thesis. Therefore, the review is divided into sections and subsections as demonstrated in Figure 2.1 below.

- The first section presents a review of the background of the four sports codes.
- The second section presents a summary and conceptual model of the components/themes of the athlete's well-being, including background to athlete's demands and injury situations.
- The third section presents literature on published best medical practice guidelines in sports. These guidelines are described under the themes shown in Figure 2.1 below.
- The fourth section tries to describe sports development and governance in Uganda.
- Note: The literature review for the third and fourth questions is reported under chapter five and six respectively.

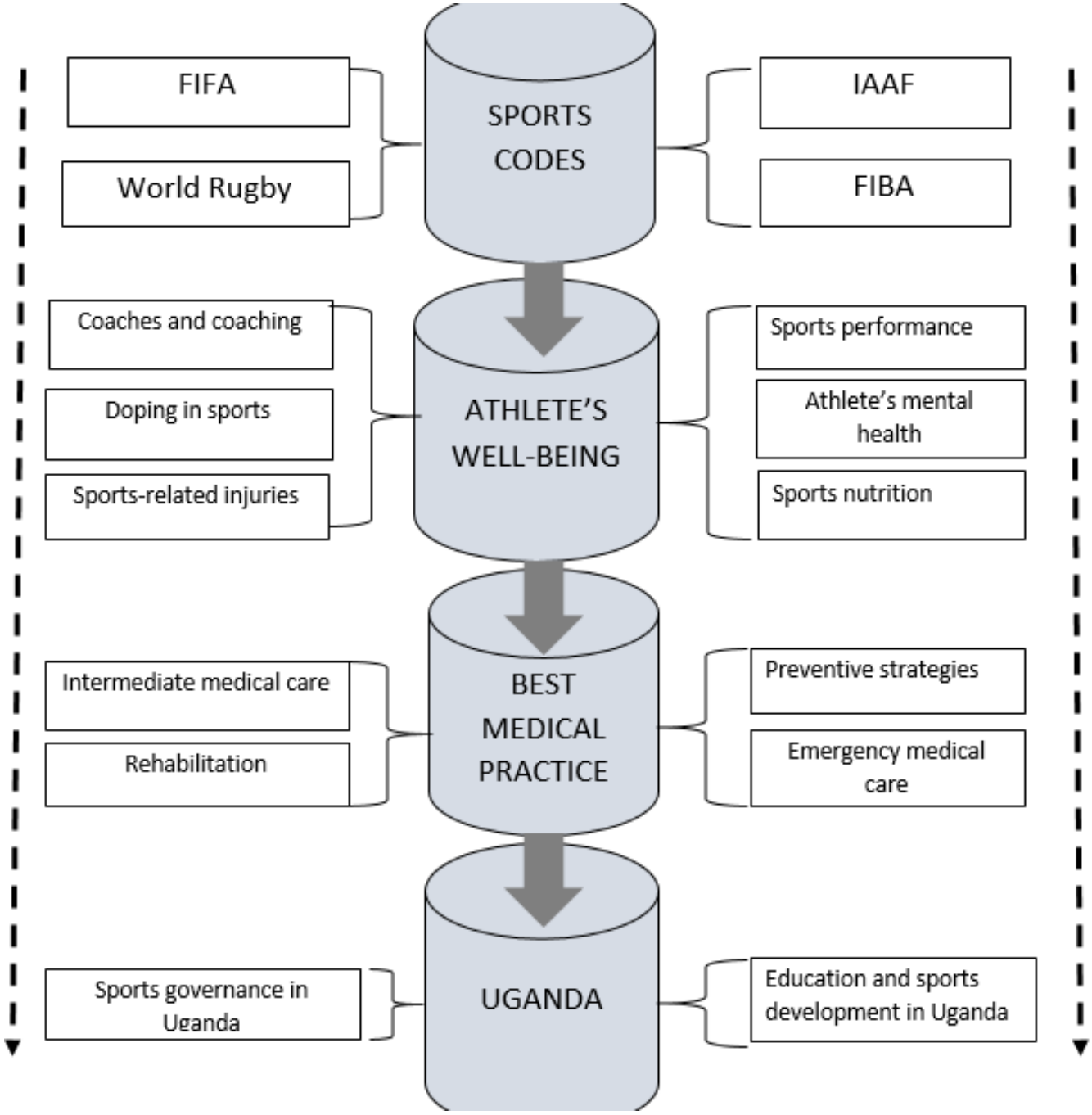


Figure 2.1: An illustration of the literature review flow chart for study 1-2 and 4.

2.2 SPORTS CODES

Introduction

The section below presents the origin of the four sporting codes where the research took place in Uganda (athletics, basketball, football/soccer and rugby union). The developments within the four sporting codes have been also described including the changes that have seen many sporting codes change from being amateur to professional sports in the 21st century. The challenges that came with the changes have been highlighted.

2.2.1 Athletics

The sports of athletics represent track and field, and out-door sports (cross-country and marathons). Koriobos, a cook from the city of Elis in Greece, is credited to have started athletic sports after winning a "stadium" race (a sprint of about 192 metres) around 776 BC. However, archaeologists argue that athletic events started earlier than 776 BC (Ryan, 1968). The reason being, in 884 BC, several athletic events were part of the ancient Olympic Games. Such events included longer foot races, a race in armour, and a pentathlon (Costache, 2015). Examples of the pentathlon event are the "stadium" race, long jump, discus throw, javelin throw and wrestling (https://www.olympic.org/athletics). In other situations, athletic events were always part of celebration activities in Europe, such as local fair and festivals, and Tailteann and Highland Games in Ireland and Scotland respectively. The report further indicates that in Great Britain they had a traditional "pedestrian" event which attracted competitive walking or running along the streets.

Athletic events were promoted into schools and military colleges in England and USA (https://www.iaaf.org/heritage/history). In the late 19th century, the first modern athletic championships were recorded (The Intercollegiate Association of Amateur Athletes of America 1860s). In this championship, a variety of athletic activities took place in a single meet, such as running, jumping and throwing, walking and other combined activities. The revival of Olympic Games towards the end of 19th Century (1896; in Athens) saw athletics as one of the sports in these modern Olympic Games (Courson et al., 2014; Costache, 2015). At that time, the event only catered for men.

For many years, track and field remained an amateur sport. Athletes could not accept training money or cash prizes. It was a serious offence if an athlete engaged in any professional activities associated with the sport. They faced the possibility of being banned from competitions for life (Athnet, 2018). The early 20th century, there was increased interest

and need for physical exercises around the world. Therefore, there was a need to have a governing board of athletic authorities, not only for the athletic programmeme but also to standardise technical equipment and world records. In 1912, 17 national athletic federations established the International Amateur Athletic Federation, and an administrative council of seven members (IAAF) (Alonso et al., 2009). Currently, the council has 27 members. This has come as a result of the increased number of affiliated federation members from 17 in 1912, to 214 in 2015, with the inclusion of South Sudan and Kosovo.

For several decades, athletics remained an amateur sport. After the World War II (1945), athletic programmes started to change because of the effects of industrial and political evolution at the time. The increased passion for athletic sports, coupled with the development of applied sports sciences, improved equipment and new training brought changes to the sport (https://www.iaaf.org/heritage/history). Athletes improved their individual performances. There was increased media coverage, including the TV coverage in 1960s. Many companies began to see the commercial value for sports. By 1985, it was not possible for athletes to hold on to the amateur style of sports participation. Athletes started to be motivated financially for excellent performances. This enabled them to spend more time training in an attempt to improve personal or team performance. In 2001, IAAF became a professional sport, and the organisation's name changed to the International Association of Athletics Federations.

The current official IAAF Competition Programmeme includes eight World Athletics Series events. In addition, a variety of major competitions are at continental and national levels. There are also 14 multi-sport and Area Games competitions, including the Olympic Games that take place on all the continents. Despite of lack of physical contacts with the opponents in athletics, athletes have to train to sustain a high work load to meet the strength and endurance demands of their respective events (Palisch & Merritt, 2017). The mental and physical stresses associated with training and competition in the modern athletic sports have contributed to changing the equilibrium of the athletes' well-being.

2.1.2 Basketball

Professor Dr. James Naismith invented the game of basketball (Ching & Khalili-Borna, 2013). He worked as teacher for physical education, and was also an instructor at the International Young Men's Christian Association Training School (YMCA), in the United States of America (Akinbo, Odebiyi & Adebayo, 2007; Riess, 2013). The original equipment used for the game was a basket and a ball. A few years later, one of the players (Mahan) of

the game proposed to call the sport either “Naissmith” or “a basketball”. The latter term was accepted and eventually became institutionalized (Griffiths, 2010; Wyckoff, 2013). The game spread-out in USA, through the YMCA training schools before it crossed to Canada. By 1895, the sport had been introduced to women’s high schools (Riess, 2013). The first official game was played in the YMCA gymnasium in New York in 1892. Later in 1898, the first professional league: - known as the National Basketball League (NBL) was formed (Griffiths, 2010).

The formation of the first professional league, the National Basketball League (NBL), was to protect players from exploitation and to promote a less rough game (World of basketball, 2019). Following the new rules and better administration of the sport, basketball spread throughout in the towns and cities of United States and Canada in the 1920s (Riess, 2013). In the years before World War I, the associations in USA: Amateur Athletic Union and the Intercollegiate Athletic Association of the United States (in-charge of the National Collegiate Athletic Association) contested for who should have control over issuing the rules for the game. This led to the formation of the “International Basketball Federation Amateur” in Geneva, Switzerland in 1932 (FIBA; its acronym, derived from the French Fédération Internationale de Basketball Amateur). This was an international association of eight member countries. The countries involved in the formation of the international federation were: Argentina, Czechoslovakia, Greece, Italy, Latvia, Portugal, Romania and Switzerland. The main goal of the new organisation was to oversee the amateur players (Beibier, 2019). After two years, the International Olympic Committee (IOC) officially recognised the sport of basketball. During the 1936 (Berlin) summer games, the men's basketball was part of this international event for the first time (Griffiths, 2010). In 1989, the International Basketball Federation dropped the word *Amateur*, and it is currently known as the International Basketball Federation (FIBA) (Hanold, 2012). FIBA defines the rules of basketball, specifies equipment and facilities among other responsibilities. There are currently 2013 registered national basketball federation members; organised into zones: Africa, America, Asia, Europe and Oceania zone. FIBA organises and oversees international competitions that include the FIBA Basketball World Cup, the Olympic Basketball Tournament and 3x3 basketball matches.

During the last 20 years, there have been numerous developments in the sport of basketball (Drakos et al., 2010). For example, there has been increasing fan support of the basketball worldwide (Aman, Forssblay & Larsen, 2018). This is due to extensive media

coverage of the National Basketball Association competitions in the USA, and the inception of the Women's National Basketball Competitions (Cumps, Verhagen & Meeusen, 2007a; McCarthy et al., 2013; Gundre et al., 2015). In addition, scientific literature continues to emerge about the health benefits of engaging in the recreational basketball (Aman, Forssblay & Larsen, 2018; Tirabassi et al., 2016). In fact, reports suggest rapid growth in the participation of basketball sport from 300 million participants in 2006 to more than 450 million in 2012 worldwide (Akinbo, Odebiyi, and Adebayo, 2007; Cumps, Verhagen & Meeusen, 2007; Kilic et al., 2018; Wyckoff, 2013). Traditionally, basketball sport was considered a non-contact and a safe sport (Drakos et al., 2010). The game is played by two opposing teams of five players with each trying to score a point against each other by shooting a ball through a hoop (the basket) under organized rules (Wyckoff, 2013). However, reports are showing that aggressiveness, strength and quickness play an important part against an opponent in the sport of basketball (Akinbo, Odebiyi & Adebayo, 2007; Drakos et al., 2010; Gundre et al., 2015; Leppanen, Pasanen, Kujala & Parkkari, 2015; Khan et al., 2018; Teramoto et al., 2016; Tirabassi et al., 2016). For example, players routinely use their bodies to fight for position; to intentionally draw contact in the air while shooting the ball (Akinbo, Odebiyi & Adebayo, 2007; Drakos et al., 2010). The coaches even teach players contact moves (Drakos et al., 2010). The physical nature of the game and the demanding game schedules for professional teams, has affected the well-being of basketball players (Drakos et al., 2010; McCarthy et al., 2013).

2.1.3 Football (soccer)

Historical reports indicate the modern type of football evolved from many forms of games over many centuries. The earliest form of the game is reported in China, the *Tsu' Chu'* between 2^{nd}-3^{rd} centuries BC. But they are other forms of the game reported too in the literature such as the Japanese *Kemari* (500-600 years BC to date), and the Roman *Harpastum* (700-800 BC*)*. For the Romans, a report indicates they took the game to Britain (700-800 years BC). However, there is no evidence for the type of skills required to play the Roman type of the game at that time. History suggests, the football game did not develop rapidly like other sports (Athletics, Basketball and Rugby). In Britain, many local forms of the games were played until mid-19^{th} century (History of football, 2018a).

The ancient type of football had both positive and negative facets. On a positive note, the education institutions favoured the sport. This was because the players showed good

character attributes such as: loyalty, selflessness, cooperation, subordination and resistance to attacks ((History of football, 2018b). In the early forms of the game matches were spontaneous and usually played by an indefinite number of players. There was always heated contest among the villages - through streets and squares, across fields, hedges, fences and rivers. At Cambridge University, around 1848, the disorganised, violent and spontaneous, but entertaining type of game started to attract the attention of the sponsors. In 1863 the different playing styles of the game led to changes in basic rules governing the game. One group went to Cambridge and evolved into the first football governing body in the whole world, the Football Association (FA) in England (Bjørneboe, 2014: PhD thesis)

After the English FA, several other national football associations were formed (1873 to 1901). The spread of the game to other parts of the world continued slowly, but later gained momentum. This was attributed to the Britain's influence that had increased around the world towards the end of the nineteenth century. The epitome of this development led to the founding of FIFA in May 1904 by seven national football associations. The founding members were from associations of France, Belgium, Denmark, Netherlands, Spain, Sweden and Switzerland. The Great Britain football association joined later 1905. By the late 1930s there were 51 FIFA members. Furthermore, records indicate, the period after World War II (1950) more nations had joined the world football federation (73 nations) (History of football, 2018b).

In the beginning, the FIFA organisation was basic but has evolved into the highly structured organisation which exists today. The details of the roles and responsibilities of the FIFA organs are explained on the FIFA website (https://www.fifa.com/).

2.1.4 Rugby

From 1667 to 1823, the game of football was played at town schools in England. Different versions of the game were played among the different schools (History of football, 2018b; Richards, 2007). Such schools included the: Rugby, Cheltenham, Shrewsbury and Marlborough school. During these periods, the game was dangerous with many injuries. Also, the number of players per side was not fixed. Sometimes hundreds of players would take part in a kind of huge rolling maul (Collins, 2015). This form of ball game had less strict rules. Anyone could handle the ball, but no-one was allowed to run with it in their hands towards the opposition's goal. Reports indicate that it was one moment at rugby school,

around 1823, a player (an Englishman named William Webb Ellis) decided to run with a ball in the hands towards the opposition. This action, plus other acts such as kicking, led to the codification of this form of sport to 'rugby sport'. This form of the game continued to be played in public schools between 1840 and 1860. Later it was taken to the universities and town clubs. In 1863, Blackheath club members, disagreed with the new rules that been adopted after the Freemason's Tavern meeting "Cambridge football association rules". These rules meant that hacking, stripping, and running with the ball in the hands towards the opposition's goal after a fair catch was illegal. The Blackheath preferred the game where running with ball in the hand could be accepted, hence the rugby football sports code was created. A few years later, a meeting was held at Pall Mall restaurant in England by several rugby playing schools and clubs. After that meeting, Rugby Football Union was founded in 1871 (Collins, 2015).

In 1884, there was a disputed try in a match between Scotland and England. The disagreement resulted in three rugby unions (Scotland, Ireland, and Wales) to meet in the Manchester in 1886 to form the International Rugby Football Board. The England rugby union only joined in 1890.

The International Rugby Football Board was renamed the International Rugby Board (IRB) in 1998. And then World Rugby in 2014. World Rugby (WR) board now exists as the world governing body for the sport of rugby union. WR organises the Rugby World Cup every four years. The largest of the WR competitions is the men's Rugby World Cup, which has been contested every 4 years since 1987. It also organises a number of other international rugby competitions, such as the World Rugby Sevens Series, the World under 20 Championship, and the Pacific Nations Cup. In addition, rugby football (Sevens version) was staged at Rio 2016 Olympic Games.

The popularity of the rugby union sport has continued to grow rapidly like any other contact sports (Freitag et al., 2015). In 1995, the sport of rugby became a professional sport (Mclntosh, 2005). Rugby is one of the toughest, violent and most physically demanding team sports played in the world today. It is further claimed that violence and intimidation have become integral part of rugby strategy (Sack, 2003). The sport is characterized by aggressive physical contact and high impact activities (Kaux et al., 2015). It further demonstrated that the physical exertion in the game of rugby is very intense and depends on the playing position. The game is rough, and the players some time do not wear any protection equipment

(King et al., 2015). The demands of the game require that players train hard. In addition, to the players' physical demands, travel and match schedules added to the stressful load the players encounter (Sedeaud et al., 2012; Quarrie et al, 2016), all this has affected the player's well-being. WR has an active role in uplifting and protecting players' welfare

2.1.5 Summary of the literature: International sports codes and bodies

The literature above has demonstrated the humble, but exciting beginning of the four sporting codes under discourse. The description shows that at the beginning of these sporting codes, there was modest administrative and management structures. Currently, the four sporting codes have millions of athletes and and supporter's worldwide. Therefore, the management of these sports have become more complex, with several boards and committees established to be responsible for numerous challenges encountered by each federation. The most relevant development in all the codes is the change from amateurism to the professional level of participation for their athletes.

A modern professional athlete must have a certain anthropometric profile and fitness levels to be able to perform. They also need to possess certain peculiar skills and techniques to perform at top level. They are involved in physically demanding games, with high impact activities, couple with unfriendly match/competition schedules and duration (Reneker et al., 2017). These requires an athlete to train harder and even make more personal sacrifices. The combination of these challenges affect their well-being.

2.2 WELL-BEING OF ATHLETES

The search in the literature about the term well-being revealed that it is still a contested term to define. Some scholars have described it as a neglected field of research; intangible and difficult to measure (Dodge et al., 2012; Ryff, 1989). Others who have attempted to define the term well-being have only come up with indistinct and generalised descriptions. Earlier, Bradburn (1969) had mentioned that well-being was affected by challenges people face on daily basis. However, in 1978, Shin and Johnson are reported to have defined well-being as quality of life of individuals (Dodge et al., 2012). According to the World Health Organisation (WHO), the definition of Quality of Life (QoL) is "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns".

Recently, Dodge, Daly, Huyton & Sanders (2012) suggested that the term well-being should centre on a state of equilibrium or balance that can be affected by life events or challenges.

In the field of sports, athletes have to do an enormous volume of hard work to be competitive (McKenna, Delaney & Phillips, 2002). Their level of equilibrium is ever changing because they have to optimize the delicate balance between training load and recovery. Failure to do so, increases their risk of getting injured or ill. The resultant effect of all these is their underperformance. Therefore, it is important to monitor athlete's training (coaching), physiological and mental health, doping, nutrition and performance; all of which contribute to their well-being (Lamberts, Swart, Capostagno, Noakes, & Lambert, 2009). Consequently, the proposed definition for athlete's well-being for this study project had several descriptors hereafter termed as "components/themes". The well-being of athletes involves: coaching, nutrition and supplements, performance, mental health, injuries and illness, while avoiding banned substances (Figure 2.2).

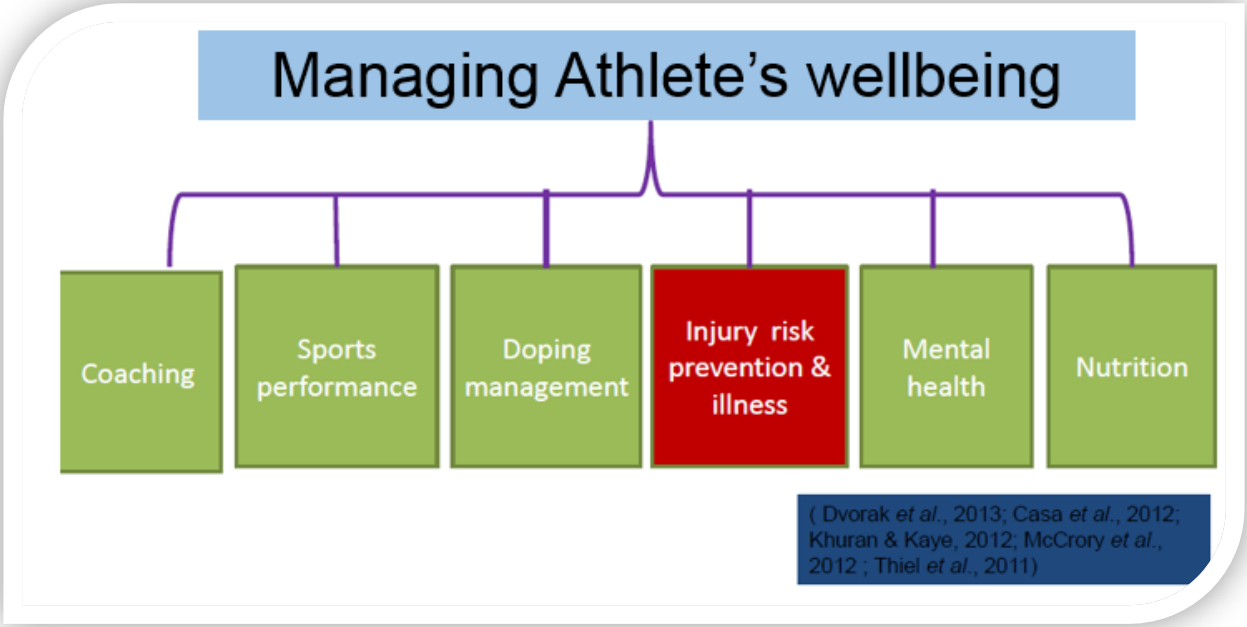


Figure 2.2: Components/themes of the athlete's well-being

Components/themes for the well-being of athletes

In this section, I describe the components/themes of the well-being of athlete as presented on the research conceptual model. I will also briefly explain and provide evidence why each of the components/themes is important to the health and safety of athletes.

2.2.1 Coaches and coaching

In the contexts of sports, coaching is a process through which components/themes of performance that requires improvement are identified then developed (Knowles et al., 2006). A coach is an educator of the technical skills; he/she will also use all the motivational techniques available (Kim et al., 2016). Through the use of theory from systematic scientific knowledge, sports coaches can be defined as problem-solvers (Knowles et al., 2006). For example, long-term implementation of preventive training programmes (PTP) in youth sport requires coach involvement (Pryor et al., 2017). Furthermore, coaches can play a significant role in health education and contribute to the psychological well-being of young people. Additionally, many youth sporting events worldwide, medical professionals are rarely present during practices or games at the grassroots level (Van Hoye et al., 2016). Coaches play a crucial role in recognizing the signs and symptoms athlete's ill-health.

The coach can contribute to self-determination (Jowett et al., 2015; Ryan & Deci, 2000). The Self-determination theory, allows coaches to undertand human motivation and personality through its three tenets of competence, connection and autonomy. These coaches understand that the need to gain mastery, relate to co-coaches and feel in control of their own actions is important. Moreover, the co-coaching model is one recently introduced in Uganda (Makubuya, 2019). Preminary evidence suggests that more confident coaches have more extensive player-coach interactions, knowledge and sternthen their coaching skills regardless of their backgrounds playing and coaching backgrounds.

2.2.2 Sports performance

Sports performance is a complex multifactorial phenomenon, and is determined by numerous intrinsic (genetics, motor behaviour, physiological and psychological factors) and extrinsic factors (training, nutrition, development opportunities and overall health conditions) as well as by the interaction between them (Bishop & Girard, 2013). To be a top-level athlete, several years of dedication to an organized and rigid training system, with many sacrifices are needed.

Performance entails working towards an achievement. Sport performance is the manner in which sport participation achievement is measured. In modern days, this achievement can be measured against a standard scale. The International Olympic Committee (IOC) recognizes the four sporting codes (athletics, basketball, football and rugby)

performance rating systems. For example, in the individual sports such as athletics, timing or height obtained in a single jump is the rating used by judges to determine performance. In most team sports, it is the point scores or goals that are used as grading for performance. The other way of judging sport performance can be beyond just an objective grading. For example, in an ambiguous tackling situation, a football referee has to decide whether to award a penalty. Similarly, a tennis player may judge her opponent's performance during a game in order to choose an appropriate strategy, and basketball coaches assess the abilities of athletes in order to select the best players for a team. The equilibrium of an athlete's well-being is ever at risk of disproportion because of the judgement surrounding any of the above judgments to her or his performance. Besides, elite sport or sport at the high level is not a depiction of health due to the extra high exposure of training and the demands of the competition which is paired with winning at all cost. Additionally, the media coverage of sports events, it add more pressure to the athlete how his or her performance will be judged by the public. People involved in sport typically aim to make accurate judgments, and thus avoid the negative outcomes of mistakes (Plessner & Haar, 2006).

2.2.3 Mental health in sports

Mental health is an important component of athlete's well-being. Unfortunately, for many national and international sports federations, mental health and mental disorders are not accorded the level of significance as it is for physical health of their athletes. According to the World Health Organisation, mental health is described (World Health Organisation, 2004):

> *a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community.*

The above definition illustrates the positive sense of mental health. Therefore, this is a foundation for the effective functioning of individuals. Evidence show that sports have positive psycho-social benefits. In addition, moderate-to-vigorous intensity exercises improve physical and mental health (Biddle, Mutrie & Gorely, 2015). However, in competitive sport, there are demands on athletes that require them to achieve success. The demands contribute to poor mental health (Bauman, 2016; Donohue et al., 2007). Example of the common stressors include pressure from scoring goals and winning trophies, extended time away from athlete's families, injuries or illness, relationships, media coverage and judgemental fans.

Professional sports, mental health issues for competitors in individual as opposed to team sports can be difficult to identify. Pushing oneself too far by continuing to train through pain could be seen as a form of self-harm. The managers, coaches, clubs, national governing bodies and player's unions have a role in supporting sport professionals to manage their mental health.

The Professional Footballers Association has taken on a vital role in increasing support available to players with mental health problems. The Premier League is rolling out mental health training for their academy staff and The Football Association is planning to include content about recognising the signs and symptoms of mental health problems in its coaching qualifications as part of developing a mental health and well-being plan. A group of people with medical expertise and a passion for rugby came together to establish the State of Mind (SoM), a campaign to improve the mental health, well-being and working life of rugby league players and communities. SoM has delivered free mental health player awareness presentations to help players identify how they can improve their mental well-being and encourage them to ask for help if they need. British Athletics has implemented a system to support athletes experiencing mental ill health – coaches share their or their athlete's concern with the British Athletics medical team who could then refer the athlete to a psychologist or psychiatrist. The British Athletes Commission (BAC) has set up a triage service for support, and has access to appropriate sport counselling, ensuring a route to access mental health support for elite swimmers. However, this has not been established in under developed countries, especially in Sub-Sahara Africa.

2.2.4 Doping in sports

Doping is one of the components/themes of the athlete's well-being on research conceptual model. The doping practice is increasingly becoming an issue of concern in competitive sports (Dvorak et al., 2014). Doping is defined as 'the occurrence of one or more anti-doping rule violations set forth in the Code of the World Anti-Doping Agency'. The most common anti-doping rule violations are the presence in an athlete's sample, use, attempted use or possession of prohibited substances or methods as outlined in the World Anti-Doping Agency (WADA)'s prohibited list. There also growing number of drugs being approved as therapeutical as well as out-dated medicinal products. These products are claimed to have health and sports performance-enhancing properties, and many athletes have failed a drugs test after using them (Claassen, 2011; Dvorak et al., 2014).

Doping is a serious problem in sports; it jeopardizes the physical health of athletes and compromises the integrity of sport. The practice further destroys the idea that all competitors have equal opportunity to win and does not set a good example for young athletes (Dvorak et al., 2014). Most reports claim that this unlawful act is committed in isolation by an individual athlete. However, evidence suggests that there also groups and individuals within the athlete's network that play a role, an example being the American cyclist Lance Armstrong, (Bell et al., 2016; Engelberg et al., 2015; Moston et al., 2014; Nixon, 1992; Paoli & Donati, 2014). He was awarded a life time ban from all competitive cycling in 2012 (Bell et al., 2016).

WADA is an international organization, responsible for monitoring the implementation of the WADA Code by its signatories. The Code works in conjunction with six International Standards. The standards include the Prohibited List of drugs, testing and investigations, laboratories and Therapeutic Use Exemptions (TUEs), protection of privacy and personal Information, and Code Compliance by Signatories. In 1989, the IAAF and the other Olympic federations signed a joint declaration against doping, with a random and targeted testing out-of competition programme being initiated; now it is a regular practice on the IAAF programme, both at national and international level. The Olympic Movement governing body, the IOC makes the Code mandatory for the entire Movement. During the Olympic Games, it oversees all doping control and testing processes in compliance with the Code regulations.

A statement on the International Olympic Committee website follows: “Protecting clean athletes by fighting against doping is a top priority for the IOC, which has established a zero-tolerance policy to combat cheating and to make anyone responsible for using or providing doping products accountable”.

Several experts have suggested the best way to stop doping is to invest in preventive measures (Ljungqvist, Horta, & Wadler, 2008; Muwonge et al., 2015). These measures include improving on education; the analysis of data and forensic intelligence; working closely with experienced stakeholders (the national anti-doping organizations, the laboratories, athletes or team physicians and related biomedical support staff).

2.2.5 Nutrition in sports

A modern professional athlete must have a certain anthropometric profile and fitness levels to be able to perform (Spanias et al., 2019). Hard training programmes increase stress

hormone levels, and may compromise the body's immune system to fight these infections (Moreira et al., 2011). All athletes should adopt specific nutritional strategies before, during and after training or competition to maximise their mental and physical performance (Beck et al., 2015). The selection of nutrient-rich foods must be done carefully to reduce the risk of developing nutrient deficiencies (Pelly & Burkhart, 2014). There are guidelines on the amount, composition, and timing of food intakes (Fahey, 1995; Robert-McComb, 2008).

2.2.6 Injuries

Outline of the injury section

The impact of injuries do affect the athlete's well-being (Freitag et al., 2015). In this subsection I will firstly give an explanation why we are experiencing more sports injuries in 21st century. Secondly, I will give a summary of the epidemiological data about sports related injuries at different levels of participation, including concussions and cardiac arrests. The epidemiological data is organised in such way that I start with injury cases at multiple sports events; their nature and mechanisms. Then present the injuries occurring at world cup events for sports of athletics, football and rugby; including summaries of the injury nature and mechanisms. Thirdly, I will present some epidemiological studies from the different countries including Africa (developed and developing countries). The last section, discussed the concerns from the international sports community and general population regarding injuries and their recommendations.

Increasing burden of sports-related injuries in 21st century

From the time of industrial revolution (1945), the style, form and the perception of sports participation have rapidly changed. There are now sophisticated training and conditioning methods, greater technical knowledge and improved sports science, including medical care services (Sands et al., 2017). There are also rule changes to make sports participation safer (eg rugby scrum, basketball elbow, football head knockes). Furthermore, there are more sports related programmes and competitions, such The "FIFA Forward Programme". This programme attracts more people around the global to take part in 30min soccer participation as health programme (Cumps, Verhagen & Meeusen, 2007; Gundre et al., 2015; McCarthy et al., 2013). Also scientific literature continues to emerge about how

participation in sports at all levels have health and economic benefits including the overall well-being to individuals (Aman, Forssblay & Larsen, 2018; Bahr & Krosshaug, 2005; Tirabassi et al., 2016; Van Gent et al., 2007). Currently, there are extensive media coverage of sports events as compared to three decades ago.

The growth in sports participation has enabled traditionally amateur sports such as athletics, basketball, and rugby to allow professional practices (Mclntosh, 2005). The professional practice has had enormous effects. The effects include the way the game is played, the level of fitness, the meticulousness every player must have, and the application of modern science and medicine in sports. This high quality fitness and diligence requires players to train hard and longer as a prerequisite to playing in the professional teams and possibly lower the risk of injury of any kind (King et al., 2010; Quarrie & Hopkins, 2007; Sedeaud et al., 2012). Some sports a tough and violent, therefore, they are physically and physiologically demanding (Akinbo, Odebiyi & Adebayo, 2007; Drakos et al., 2010; Gabbatte et al., 2008; Gundre et al., 2015; Khan et al., 2018; Leppanen, Pasanen, Kujala & Parkkari, 2015; Teramoto et al., 2016; Tirabassi et al., 2016; Stolen et al., 2005). They are also characterized by aggressive physical contact and high impact activities (Kaux et al., 2015). Most sports athletes do not even wear any protection equipment. Hence the athletes require high levels of technical skills and well-developed physical capabilities in order to perform at that level (Feddermann-Demont et al., 2014; Stolen et al., 2005). This coupled with style of coaching in some sports. For example, traditionally, basketball sport was considered a non-contact and a safe sport (Drakos et al., 2010). However, reports are showing, basketball players routinely use their bodies to fight for position; to intentionally draw contact in the air while shooting the ball (Akinbo, Odebiyi & Adebayo, 2007; Drakos et al., 2010). The coaches even teach players contact moves (Drakos et al., 2010). The above level of sports participation, and demands up on the athletes have increased the risk of injuries.

The Olympic Charter, the codification governing the organisation and operation of the Olympic Movement recommend sports federation to carry out injury surveillance at all major sports events. The recommendation is the first step to ensure that athlete's health protection is guaranteed. The injury data from the surveillance studies provide very important information for injury prevention (Finch, Valuri & Ozanne-Smith, 1999; Finch, 2006).

i. Multiple sports events

The injury data for the sport of athletics, basketball, football and rugby at multiple sport events showed the following. During 2008 Summer Olympics in Beijing, the injuries from the three sporting codes were 241 (11.3%) athletics, 38 (13.2%) basketball, and 156 (31.5%) football (Junge et al., 2009). During the London summer Olympics, 368 (17.7%) athletics, 32 (11%) basketball, 179 (35%) football (Engebretsen et al., 2013). During the Rio de Janiero Summer Olympics, athletics 12%, basketball 8%, football 27% and rugby union football 19% (Soligard et al., 2017). The results show that the risk of injuries at top level is high. The injury rates range from 70-97 injuries per 1000 registered athletes for the period of 12 years. The mechanism to these injuries have varied among the sports codes, for examples in athletics, injuries are mainly due to overuse, and in other sporting codes, they are mostly due to contact with another athlete.

ii. International federations

At international federation levels, sports related injuries have been published except for the basketball. The IAAF conducted an injury study for the first time during the 2007 world Athletics Championship in Osaka, Japan (Alonso et al., 2009). One hundred and forty one injuries were recorded after the competition, and 83 of these were time loss. The incident rate of injuries during the event was reported to be 97 injuries per 1000 registered athletes. Alonso et al (2010) reported athletic injuries in Berlin 2009 IAAF World Championships. A total of 236 injuries were recorded, and the overall incident rate was 135.4 injuries per 1000 registered athletes, 44% of the injuries were reported to have been due to Overuse, followed by non-contact trauma (13%) and recurrence (10%); with estimated of 44% athletes having time-loss injuries. Alonso et al (2012) reported injuries and illness for the 13th International Association of Athletics Federations World Championships in Athletics 2011 in Daegu, Korea. Two hundred and forty-nine injuries were recorded from 1512 registered athletes during this event. The author further indicated that the incident rate during this championship was 134.5 injuries per 1000 registered athletes. Strain (31%), sprain (22%), cramps (17%) and skin lesion (9%) common type of injuries; with overuse most common cause (59%), followed by non-contact (12%) and re-current injuries (9%)

There are studies reported from Europe athletic events. Edouard et al (2012) reported 30 injuries during a three day sports event; the 2011 Paris European Athletic Indoor Championship. The authors indicated that it was equivalent to an incident rate of 47.5 injuries

per 1000 registered athletes. And that 27% of the injuries caused athletes to lose time; 43% were injuries on muscle tissue (strain 33% and cramps 10%), skin lesion (13%) and sprain (10%). The mechanisms for these injuries were due to mostly non-contact (30%), and overuse (20%). In 2014, the same authors reported injuries at Helsinki, 2012 Athletic Championships. A total of 133 injuries were recorded, equivalent to an incident rate of 98.4 injuries per 10000 registered athletes. Similar injury natures as for 2011, but in this case, the commonest mechanisms of these injuries were overuse (38%) and non-contact (25%). Forty seven percent of these injuries resulted into time-loss.

In 2014, Feddermann-Demont et al further reported IAAF level championship injury summary (2007-2012). These championships include seven World Outdoor Championships (WOC and European Outdoor Championships (EOC) and Olympic Games (OG), four indoor championships (World and European Championships (WIC and EIC), one World Youth Championships (WYC; aged 16–17 years) and one World Junior Championships (WJC; aged16–19 years). On average, the incident rate of 81.1±4.2 injuries per 1000 registered athletes was established. The average time loss incidence was 29.0±2.6 during competition. In Africa, using Google scholar, PubMed and Ebscohost databases, no published injury surveillance report was established. This observation does not imply that in Africa there are no Athletic Championships events taking place, this only highlights a need to initiate an injury surveillance system. The above reports do show that there are injuries associated with participating in athletic sports. The risk to injuries has not changed significantly since the start of injury surveillance by the IOC and IAAF medical team.

Randazzo et al (2010) reviewed and analysed data about basketball related injuries from the National electronic injury surveillance system of US consumer Product Safety Commission from 1997 to 2007. Over 4 million basketball related injuries are reported to have received medical services at various US emergency departments. The report presented the commonest injuries as strains and sprain, fracture and dislocation. The report did not include the mechanisms or time lost due to the injuries. Another study reported on sports and recreational injuries occurring at the USA hospital emergency department (Padegimas et al., 2016). These authors indicated that sport related injuries at the emergency department did not require admissions. The injuries associated with playing basketball were the most prevalent (32%) compared to other sports. The mechanisms of these injuries, and time-lost by athletes were not been accounted in the two reports.

Drakos et al (2010) reported a summary of national basketball association injury of a 17 year period. A total of 12 594 injuries were reported resulting into an injury rate of 19.1 injuries per 1000 player per hour. Seventy two per cent of the match games were missed due to the injured athletes. Sprains, (28%), inflammatory conditions (22%), strain/spasms (22%) and contusions (15%) were the commonest injury categories. Basketball injury risk has been compared to other contact sports such as soccer and football in the United States of America using emergency department hospital records. The injury rate of basketball was 1.5 injuries per 10 000 hours of participation, followed by 0.9 injury rate for football and 0.4 injury rates for soccer (Carter, Westerman & Hunting, 2011). The concluded that a professional basketball athlete was at a higher risk of experiencing game related injuries football and soccer. Long et al (2011) aimed at comparing the injury reporting rate and concealment between the performing arts style cirque and basketball group participants in the USA. Their results showed no difference in the injury rates ($p=0.036$). However, basketball participants had several days of missing participation ($p=0.01$) in sports due to injuries compared to the performing art style cirque.

The systematic review of basketball injuries by Zuckerman et al (2018) demonstrated that basketball associated injuries are still a major challenge. The authors reported a total of 2308 and 1631 men's and women's basketball injuries respectively during National Collegiate Athletic Association men's and women's basketball between 2009/2010 to 2014/2015. This is equivalent to 8.0 injuries per 1000 playing hours and in men, and 6.5 injuries per 1000 playing hours in women injury rates. The study showed that most injuries were due to contact, non-contact and overuse respectively. Sprain (28%), strain (14%), contusion (19%), fracture 4%) and concussion (4%) were the most common categories of injuries. Forty percent of these injuries resulted into time-loss.

In football, since the 1998 world cup in France, FIFA have scientifically documented all injuries incurred by the football players. In 2013, Junge and Dvorak published a summary of FIFA competition injuries between 1998 and 2012. A total of 3944 injuries were reported from 1546 matches, equivalent to an incidence rate of 77.3 injuries per 1000 player-hours (95% CI 74.9 to 79.7) or 2.6 injuries per match (95% CI 2.5 to 2.7). The authors reported a major consequence associated with these injuries was the time lost for sports participation. For example, half of the injuries (n=1540, 47%) prevented the players from participating in a match or training. In addition, a total of 1225 (37%) injuries were expected to prevent players from participating in a match or training for up to1 week; further 152 (5%) were expected out

of participation for 8–28 days, and 61 (2%) for more than 29 days. The injury categories were mostly contusion (50%), sprain (15%), strain (10%) and concussion (2%). The mechanisms of these injuries were mostly due to contact and non-contact means. The report indicated that women players were mostly at risk of sustaining a concussion compared to male (17% vs. 14%)

Most recently, at FIFA world cup in Brazil 2015, Junge and Dvorak reported a total of 104 football related injuries from 736 players, this was equivalent to an average of 1.68 injuries per match (95% CI 1.36 to 2.00) or 50.8 injuries per 1000 player hours (95% CI 40.0 to 60.6). Most of the injury categories were contusion (38%), strain (24%), laceration/abrasion/blister (10%) and concussions (5%). The mechanism of these injuries was mostly through contact as reported by the team physicians. The above author noted that the incidences of injuries in FIFA World Cups decreased from a peak of 2.67 injuries per match in 2002 to 1.68 injuries per match in 2014, equivalent to an overall decrease of 37%. Explaining the reasons for the decrease being the better preparation of the players for the competition, the strict application of the Laws of the Game by the referees, and also the improved approach of the players towards Fair-Play.

In rugby, during the last three decades World Rugby and some rugby playing nations (New Zealand, Canada, Australia, South Africa and England) have invested in the player's welfare. World Rugby (then called International Rugby Board) started injury surveillance in 1995 rugby World Cup. This was seen as a fundamental strategy towards injury prevention in rugby (Junge, Cheung, Edwards, & Dvorak, 2004; Freitag et al., 2015). Injury surveillance studies are now implemented at all international competitions. The results from these studies have demonstrated that the risk of rugby injuries is comparable to American football and ice hockey (Fuller, 2008; Junge et al., 2004b).

A systematic review was conducted by Freitag et al (2015) to estimate the risk of getting a rugby union injury for athletes below 21 years. The authors reported 6-90% of athletes were at a risk of sustaining an injury, at incident rate of 27 injuries per 1000 player exposure hours, compared to adult incident rate of 81 injuries per 1000 player exposure hours.

Tee et al (2017) carried out an estimation of injury risk of a top high school team in South Africa (provincial and school tournaments). The authors reported 79 injuries per 1000 player hours, 54 of these injuries were time-loss; sprains were the most common injuries

(64%) caused mainly by contact situation (42%). Additionally, the rugby playing nations have websites, through which epidemiological reports are published. For example, in South Africa, BokSmart (2017) published catastrophic injury categories on their website from 2001 to 2016. The report showed 17 injuries led to fatality. Eight of these injuries were due to a brain injury, seven were due to the cardiovascular system and two were due to the spinal injuries. In Australia, SmartRugby demonstrated on their website that injuries in rugby increased with age. Players between 8-14 years, the incident of rugby related injuries was 7.4 injuries per 1000 player hours, whereas players from the age 15-senior players ranged from 10.6-38 injuries per 1000 hours.

2.2.7 Concussion

Concussion result from traumatic brain injury (TBI). TBI is strongly associated with morbidity and mortality, especially among people below the age of 45 (Naidoo, 2013). The incidences and prevalence of this injury are increasing globally because of automobile accidents, media publicity and violence of all kinds. In Australia, Finch et al (2013) reported that cases of concussions increased in hospitals by 61% in over a nine year period. The recent estimate in United States of America show that 1.6–3.8 million concussions are occurring each year (Langlois Rutland-Brown & Wald, 2006). Literature continues to emerge about undesirable consequences that follow a trauma to the brain. The most debated condition following a TBI is the chronic traumatic encephalopathy (CTE). CTE is the accepted term for a pattern of phosphorylated tau (ptau) deposition in the brain that appears to differ from age-related accumulations and neuro-degeneration (Lucke-Wold et al., 2017). Several experts have agreed that it is also secondary injury mechanism that is genetically predisposed, but triggered by insults such as neuro-trauma (Armstrong et al., 2019; Asken, 2016; Lucke-Wold., 2015).

Participating in contact sports is associated with a risk of mild trauma to the brain (Finch et al., 2013; Langlois Rutland-Brown & Wald, 2006). Dampier et al (2015) reported that “182,000 football players could sustain at least one concussion annually or about 1 in 30 youth players and 1 in 14 high school players. Nordstrom, Nordstrom & Ekstrand (2014) showed that elite soccer players had a 70% increased risk of sustaining a different subsequent sports injury in the following year after a concussion injury. Savage et al (2014) showed that the number of reported concussions in the National Rugby League increased between 1998 and 2010. Cross et al (2016) reported that 181 out of the 810 players in their study (22%),

sustained match concussions. This is equivalent to an incidence rate of 8.9 concussions per 1000 athlete exposure hours. In 2014, McFie et al reported cases of concussion among the South African adolescent rugby players. There were 74 cases of concussion from 2011 to 2013; this equated to an incidence rate of 6.3 concussions per 1000 playing hours.

Most (80–90%) concussions resolve within 7–10 days. However, the recovery process is may be longer and more complicated in children and adolescents (McCrory et al., 2005). This is concern about the long term consequences of a concussion (Prien et al., 2018). Mukand & Serra, 2015) reported on a high profile concussion injury case from United State of America. This was the Zackery Lystedt's brain injury. "He couldn't speak for nine months," his father said. "Thirteen months later, he could move his left arm a little; it took two years to get rid of the feeding tube and four years before he could move his right leg purposefully". The report mentioned that Zackery had suffered a concussion during a high school football game in 2006, but "was twice returned to play and collapsed 60 seconds after the game was over". The school district settled a lawsuit for $14.6 million.

2.2.8 Cardiac arrests

Sudden cardiac arrest is a well established medical condition in sports. Although sudden cardiac arrests are rare, they are usually tragic and attract international media attention. Sports activities are mostly reported as the trigger for this sudden heart condition. In the United States of America sports-related sudden cardiac death occurs in every 3 days (approximately 110 deaths per year) (Link & Estes, 2012). A study in Canada reported the incidence of sudden cardiac arrest during competitive sports was reported at 0.76 cases per 100,000 athlete-years, with 44% of the athletes surviving until they were discharged from the hospital (Landry et al., 2017). In the previous two decades, numerous cases of high profile athletes both in Africa and Europe have intensified the awareness (Dhutia & MacLachlan, 2018).

More than 90% of cases of sudden death occur during or immediately after training or competition (Halabchi, Seif-Barghi, & Mazaheri, 2011). Prevention of sudden cardiac arrest (SCA) in the young remains a largely unsolved public health problem, and sports activity is an established trigger.

2.3 Summary of athlete's well-being and injury risk in sports

This section has described the diverse factors (proper coaching, sports performance, good mental health, doping, nutrition and diet, and injuries) affecting the athlete's well-being. In modern sports, the increased number of participants, coupled with the growth of readily available sports equipment and facilities have exceeded the controls designed to make sports participation safer.

Contact, non-contact and overuse sport related injuries are mainly associated with soft tissue, fractures and concussions. Concussion and cardiac arrests can have dire consequences and serious financial implications. The next section will examine the concept of best medical practice to prevent injuries and manage the well-being of athletes.

2.4 BEST MEDICAL CARE PRACTICES

2.4.1 Introduction and background

The phrase best medical care is topical in modern medical practices. This term is generally used to describe a framework designed to maintain or improve effectiveness and efficiency in health care systems excluding health care finance and organisation (Perleth, Jakubowski & Buss, 2001; HSR-Europe, 2011). The framework consists of activities, disciplines or a method that may be used to identify, implement and monitor up to date application of evidence practices in health care. The framework is divided into three activities; (i) Health Technology Assessment (HTA), (ii) Evidence-Based Medicine (EBM), and (iii) Clinical Practice Guideliness (CPGs). The evidence is synthesised either as an evidence base (EBM and HTA) or in the form of recommendations (CPGs and some HTA) for different decision purposes (Perleth, Jakubowski & Buss, 2001). In this context, I

considered a framework (Figure 2.3) that would support athlete's health management, through the use of evidence based clinical practice guidelines.

Clinical practice guidelines (Field & Lohr, 1992) are usually based on scientific evidence and expert professional consensus for good medical care. Clinical guidelines are systematically developed statements designed to help practitioners and patients to make decisions about appropriate health care in the specific circumstances (Field & Lohr, 1992). The methods of developing clinical practice guidelines rely increasingly on the tools endorsed by the EBM movement (Perleth, Jakubowski & Buss, 2001). Following the success of best medical practice model for the general population, the concept of best medical practice frame-work in sports was considered (Cameron & Owens, 2014). Aspects contributing to this framework of player management include preventive, emergency, intermediate, rehabilitation and return-to-sports phases.

2.4.2 Phases of best medical care practices in sports

The best medical care practice in sports involves the use of clinical guidelines during all the phases of athlete's health care. The phases are mainly preventive, on-field, intermediate, rehabilitation and return to play medical care (Figure 2.3)

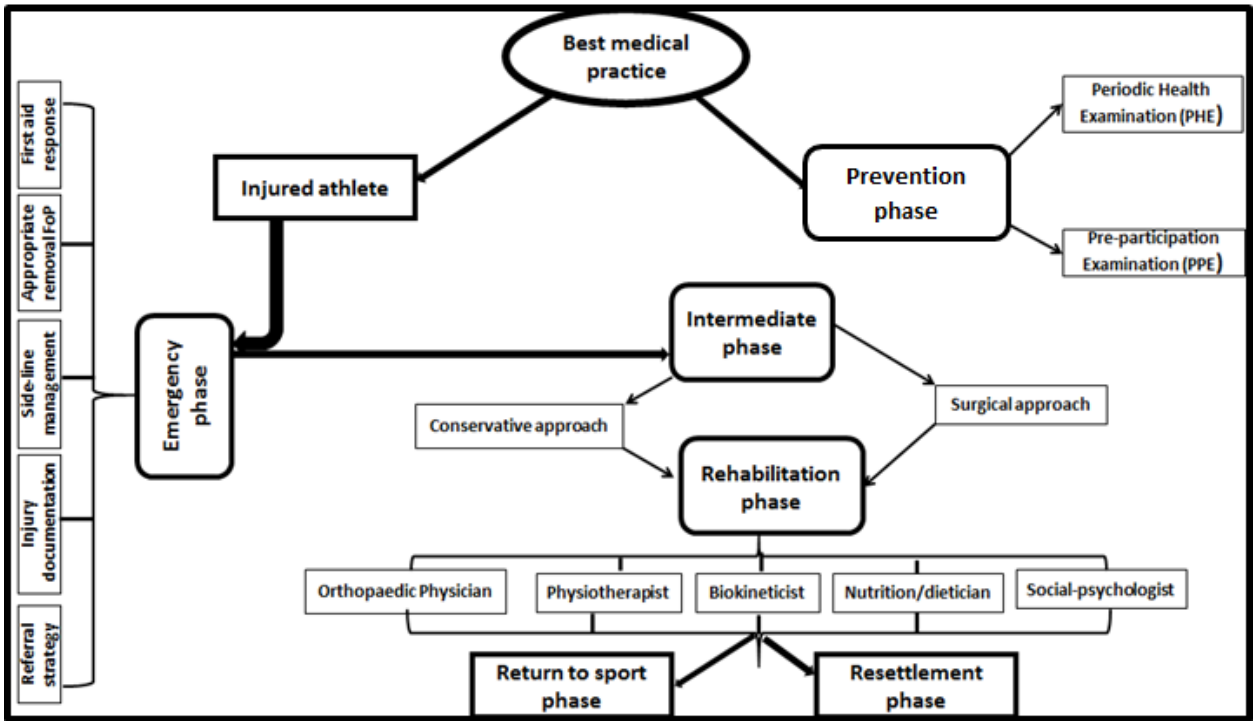


Figure 2.3: Framework of best medical care practices in sports (Lubega et al., 2019)

2.4.3 Preventive care phase

The prevention of sports-related injuries can be addressed at the three levels of care: the primary, secondary and tertiary levels (Gabbe & Finch, 2000). While the goal of primary prevention is to avoid the injury before it occurs, secondary and tertiary level prevention of sports-related injuries aims at reducing the impact of sports injuries to the athlete (Donaldson et al., 2014). For example, an athlete with a clinically silent condition, such as lethal cardiovascular condition, can be prevented from participating in sport due to this abnormality. This is defined as primary prevention because of the high risk of sudden death associated with the cardiovascular condition (Gabbe & Finch, 2000). Further, an athlete with a history of concussion, may be deterred from taking part in that sports activity until a medical clearance is given (Caffrey et al., 2002; Pherson et al., 2018). The use of appropriate field or mouth guards to participate in sports is regarded as secondary prevention. While implementing adequate medical care during on-field and rehabilitation stage is regarded as tertiary care (Gabbe & Finch, 2000). A recent systematic review showed that most injury prevention strategies are mainly secondary such as orthoses, exercises, nutrition, equipment and psychological approaches (Gabbe & Finch, 2000; Smyth et al., 2019; Wilke et al., 2018). Other approaches to injury prevention include the pre-participation health evaluation and injury surveillance (Batt, 2004; Corrado et al., 2011; Ekegren et al., 2014; FIFA, 2015). These will be described in the following sections.

a) Pre-participation health evaluation

The Pre-participation health evaluation (henceforth will be expressed as PPHE) is a sports medical policy or a principle guideline of evaluating the health status of athletes for eligibility to engage in sports (Alonso et al., 2015; Mayer et al., 2012; Miller et al., 2016; Hassanmirzae et al., 2017; Thomas, Goodman & Burr, 2011;Wilson & Jungner, 1968). The guidelines include: regular health observations (Boulware et a., 2007; Ljungvist et al., 2009; McCall, Dupont & Ekstrand, 2016); assessing the presence of overuse injuries (Garrick, 2004; Miller et al., 2015); monitoring an athlete's rehabilitation progress (Bahr, 2016; Ljunggvist et al., 2009), and predicting impairments in performance (Bahr, 2016).

The professional health care provider may fulfil two roles during the PPHE. Firstly, to exclude any possible medical problem that may be associated with sports related injuries, thereby providing a clearance to the athlete to continue participating in sports (Brukner et al.,

2004). The second role is to provide information about specific referral points or professionals that an athlete may approach for further management. Previously what should or should not be tested has been debated (Coradol et al., 2011). However, the American College of Sports Medicine a group representing exercise and sports medicine scientists, clinicians and practitioners, has recommended that PPHE strategy is appropriate and adequate for medical evaluation of an athlete (Lehman, & Carl, 2017; Miller et al., 2015). The assessments in these guidelines include the following.

i. Athlete's medical history

During the medical history interview information about the cardiovascular and pulmonary systems, musculoskeletal health (both current and past), medications and supplements an athlete has used (both current and past) and family history are obtained from the athlete. The medication history can provide an opportunity for qualified health service providers to query athletes about anabolic steroid, stimulant, or illicit drug use. The use of banned substances may have adverse effects on the health of an athlete, and if discovered can result in the athlete being banned from sports competition (Vlad et al., 2018). The manifestation of allergies and female health are also part of medical history taking.

ii. **The physical examination**

During the physical examination the outcomes of various tests contribute towards a detailed history/record of an athlete. Typical measurements conducted during a physical examination are: body mass index; resting blood pressure; visual field testing of each eye; cardiovascular evaluation; femoral pulses palpated to evaluate for asymmetry; respiratory system; abdominal examination; universal genitourinary evaluation; skin disorders (Guskiewicz & Broglio, 2015). Depending on the sport, other physical examination tests may include; a neurologic examination, including baseline testing of the concussion injury; complete musculoskeletal evaluation and laboratory testing for sickle cell traits.

The mental health state of athletes has been studied (Sander, Blackburn & Boucher, 2013). A recent study in the United Kingdom showed the need for PPHE test to be include as an evaluation of the athlete's mental health (Foskett & Longstaff, 2018). Despite this evidence not much attention has been devoted to this component in the 4th edition recommendations for PPHE tests (Guskiewicz & Broglio, 2015; Miller et al., 2015; Lehman, & Carl, 2017).

Usefulness of Pre-participation health evaluation in sports

There is evidence demonstrating the usefulness of PPHE medical strategy towards injury/disease prevention or reduction (Coradol et al., 2011). Several factors included in the PPHE such as: age, gender, injury history, body size, malformed local anatomy and biomechanics, haematological problems, aerobic fitness, muscle strength, imbalance and tightness, and poor central motor control (Marino et al., 2000; Noakes, 2007; Roe et al., 2017) are associated with sports injury risk. The PPHE injury prevention strategy is useful in identifying such factors, thus contributing to injury/disease prevention or reduction. A recent study conducted in Japan comparing the University athletes and non-athletic population showed there was a decrease by 12% in the anaemia cases among the female athletes who were undergoing PPHE screening compared to non-athletic female population who were not required to have PPHE done (Komatsu et al., 2018). The study analysed athletes' information, specifically comparing periods before the introduction of PPHE and after it was introduced to the Japanese delegation of the summer University games between 1977 and 2011.

Another example of the consequences of PPHE was in the Iranian professional soccer league, where Hassanmirzae et al (2017) performed a pre-competition medical assessment on a group of soccer players. The study revealed that soccer players with a history of concussion reported an increased number of symptoms such as: persistent headaches, nausea, and emotional feelings, and a higher severity score compared to other participants with no concussion history. This further suggests that performing PPHE could protect those athletes who had suffered concussion injury previously from exacerbating their health situations.

Other studies investigated the associations between concussion and core stability and injury risks. These studies further show the importance of getting concussion history information during the PPHE as this may prevent injury or guide the early management of injury risk factors (Bahr, 2016; Beckerman, Wange, Hlatky, 2004; Corrado et al., 2005; Drew, Cook & Finch, 2016; Jacobsson & Timpka, 2015; Pherson et al., 2018). Following a systematic review on core stability function, through the use PPHE strategy it was established that deficits in the various aspects of core stability muscle groups were associated with lower extremities injuries among the sporting population (De Blaiser et al., 2018).

Through the use of PPHE (medical history), Durant et al (1992) demonstrated a relationship between medical history (obtained from PPHE reports) and athletic injuries that required medical attention and could led to miss one game or more games. The study protocol involved an inspection of the PPHE medical reports of 674 public school student's athletes who received PPHE for 1989/1990 academic year in United States of America. There were 30% athletes who reported injuries at the end of the sports activity season in 1989-90 academic year. The season injuries in several specific anatomical areas were associated with previous injuries reported during the PPHE. For example, the knee joint complex injuries during the season were associated with previous knee injuries, and knee surgery. Also, the ankle injuries during the season were associated with previous ankle injuries and previous injuries requiring medical treatment. Both arm and other leg injuries were associated with previous fractures (Fulton et al., 2014). This study shows that information obtained during the PPHE can be used constructively to prevent/reduce injuries in the subsequent season.

Pre-participation health evaluation (PPHE) implementation

International sports bodies

Many international sports agencies have mandated member organizations to use PPHE in the planning and implementation of sports activities (McCall, Dupont, & Ekstrand, 2016). In football pre-competition physical examination was required for all participants before the final round of the 2006 FIFA World Cup, Germany (Dvorak et al., 2007). In 2010, FIFA evaluated the feasibility of the PPHE (FIFA-Pre-Competition Medical Assessment tool) by implementing it at the U-17 and U-20 Women's World Cup 2010 (Dvorak et al., 2011).

In athletics, the PPHE practice was recommended from 2009 by IAAF medical commission (Ljungqvist et al., 2009). During the 2013 IAAF World Championships in Moscow, Russia, all athletes (n=1784) were requested to answer a pre-participation health questionnaire (PHQ) on their health status a month before the event (Alonso et al., 2015). The study revealed that 29% (n=698) of the athletes carried a risk of an injury to the championship. About 49% of the athletes in the study reported at least one injury during the championships, however, the aathletes who had complained about an injury problem a month before the event had a twofold increased risk of injury during the Championship (OR = 2). The use of PPHE before international events was further applied at Youth Olympic Games

since 2010 (Adami et al., 2018; Junge & Dvorak, 2015; Soligard et al., 2017); Summer Paralympic Games in Rio 2016 (Derman et al., 2018) and IAAF (Alonso et al., 2015).

The evaluation of pre-participation health evealuation

The literature evaluating the adoption and maintenance of PPHE strategy within the sporting codes is still scarce. The few studies available in literature show compliance difficulties such as adoption and maintenance. In the United Kingdom, Fuller, Ojelade & Taylor (2007) examined the level of pre-employment, pre-season, and post-injury medical evaluation of players within UK professional team sports. The six groups of elite professional sports teams, comprising of clubs from: professional football teams, rugby union football teams, rugby league football and cricket teams were studied. The analysis showed that close to 90% of football and rugby union clubs took a pre-employment history of players' general health, cardiovascular, respiratory, neurological, and musculoskeletal systems. In addition, the majority of football and rugby union clubs implemented both cardiovascular and musculoskeletal examinations of players before employment. However, less than 25% of clubs in any of the groups implemented neurological examinations of players at pre-employment. This suggests that all the team sports did not implement best practice guidelines for the pre-participation evaluation of players at all stages of their employment as per the requirement.

Short-comings of the Pre-participation physical examination as sports injury prevention strategy

Many scholars have raised concerns about the prevention of injury risk through the use of PPHE as strategy (Drezner et al., 2017; Verhagen et al., 2012). For example, the lack of abnormal or few findings of abnormalities among the tested athletes during the PPHE tests is a reason for some authors to claim that the strategy cannot assist in injury/disease prevention in sports (Durant et al., 1992; Holst et., 2010). Hughes (2018) argues that the PPHE tests provide a theoretical answer to the cause of an injury, rather than the diagnosis. The cause of sports related-injury is multifactorial and many intrinsic and extrinsic factors contribute to the risk. Therefore, PPHE shows the likelihood of an injury occuring but does not contribute to confirming injury pathology (Hughes, 2018). There are very many benefits of practicing PPHE strategy on athletes, however, more research is needed in form of interventions to provide more evidence that it can really prevent or reduce injury risks in sports.

A study of physicians in USA, indicated that the physicians experienced barriers in the implementation of PPHE (Labotz & Bernhardt, 2015). The barriers to implementation were the lack of understanding on how to perform tests for all the items in the PPHE. Secondly the PPHE lacked standard outcome measures and required excessive time to complete the assessments adequately. In 1996, Laure investigated high-level athletes' impressions of their preparticipation examination using a self-reporting questionnaire. The author found that 36% of the athletes reported having had bad PPHE experiences, such as poor medical history taking. Also the physical examination was only restricted to blood pressure measurements, and listening to breathe sounds in the chest. A commentary from Malawi, indicated that sports resource providers and athletes did not utilize PPHE despite the availability of the services. An explanation for these findings was the lack of adequate information about sports injury risk factors or causes (Chisati et al., 2016).

Moulson et al (2018) have established that the PPHE form of the American Heart Association (62%) and European Society Cardiology (66%) form were most utilized compared to the PPHE-4th edition (52%) among the Canadian University physicians. The authors did not indicate the reasons for the preferences in the forms for medical evaluation of athlete. In Oregon, in the United States of America, 53% of the athletic directors could not demonstrate that they use the PPHE forms adequately. Therefore, athletes in that state were inadequately screened for injury/disease history or cardiovascular complications (Koester & Amundson, 2003).

There is a cost burden of doing all the PPHE tests as required by policy guidelines (Vessella et al., 2019). Some tests that are conducted from PPHE form require resourced health facilities centres that have x-rays, Ultra-sound, MRI, maximal oxygen consumption and rehabilitation services. This demand can also create barriers to use especially in developing and under developed countries (Chisati, Nyasa, & Banda Chisati, 2016).

Summary on pre-participation health examination of athletes

In summary, the PPHE strategy may assist in identifying athlete at risk of an injury (Timpka et al., 2016; Verhagen et al., 2012). PPHE also creates an opportunity for communication between the health service providers and athletes (Verhagen et al., 2012). Despite the benefits of PPHE, several barriers have been highlighted to affect its wider adoption and maintenance, especially in the developing countries. For example, the limited

resources such knowledge, human capital, and time constraint have been mentioned (Brukner et al., 2004). There also issues of facilities, and economic burdens to do all the required PPHE tests (Brukner et al., 2004).

b. Injury surveillance strategy

Outline of this section

The section describes sports injury surveillance as a strategy supporting the injury prevention programmeme. The descriptions, and practices of injury surveillance systems are mainly for the three international sports bodies (IOC, FIFA and WR). There also examples of countries practicing national injury surveillance system as a strategy to support injury prevention programmeme. This section highlights the methods of data collection and implementation, rather than evaluating the data quality. Barriers to the implementation of the systems are also presented.

Introduction and background

The term surveillance originates from the French "surveiller" meaning to “watch over” (Powell, 1991). Epidemiologists define surveillance as a dynamic, close, continued watchfulness over the distribution and trends of injury/illness occurrence (Choi, 2012). Surveillance of sports-related injuries is recognized as the cornerstone of sports injury prevention policies and practice (Finch, Valuri & Ozanne-Smith, 1999; Junge & Dvorak, 2013). An injury surveillance programme involves the systematic collection, tabulation, and analysis of relevant time-loss injury or mortality and morbidity data (Ekegren et al., 2014; Finch, 1997; Langmuir, 1963; Thompson, 1991) with the goal of explaining injury risk factors. This information contributes to the implementation of preventive measures designed to reduce the risk of injuries (Brown, 2014; Edouard et al., 2014; Finch et al., 2005; Van Mechelen, 1997).

Further, the practice of injury surveillance reveals the interest to improve medical attention to athletes (Eirale et al., 2017; Van Mechelen, Hlobil & Kemper, 1992). The surveillance stage is completed after the injury information is analysed and communicated to health service providers, coaches, managers and policy makers who have responsibilities for implementing the various programmes associated with the athlete’s health (Machellen et al., 1992; Junge et al., 2004b; Klugl et al., 2010; Engebretsen et al., 2014b).

The concept of sports injury surveillance systems in physical activities and sports has been in existence for over four-decades (Bjørneboe et al., 2011). Sports injury surveillance activities are part of medical coverage services for athletes during training, competitions and recreational sports activities, irrespective of the level of participation (Machellen et al., 1992). Despite of the long history of injury surveillance systems, the practice is mainly concentrated in high income countries such as the United States of America, Australia, New Zealand, and United Kingdom (Azadi et al., 2019).

Injury surveillance systems for International sporting bodies

FIFA, IOC and WR are international sports bodies implementing injury surveillance activities, especially at elite level in sports (Junge & Dvorak, 2013).

i. FIFA'S Injury surveillance system

An editorial report from FIFA medical officials indicated that before 1998, FIFA tournament injuries were scare (Dvorak & Junge, 2015). Although injury surveillance was done there were methodological differences, making the data less reliable. These methodological inconsistencies created considerable difficulties when attempting to extrapolate and evaluate data specific to individual groups such as schools, clubs, and nations (Leahy et al., 2019). As a consequence FIFA was the first major sporting body to standardize the injury surveillance tool (Fuller et al., 2006). This was possible through the establishment of FIFA Medical Assessment and Research Centre (F-MARC). The F-MARC injury surveillance form was designed for football sporting activities. The F-MARC injury report form is administered prospectively by the team medical officers during training or competition (Junge, & Dvorak, 2013) to record all injuries and illnesses. The form used by F-MARC is single page that is filled at every activity (match or training), whether or not an injury has occurred. The standardised nature of the data collected using the F-MARC surveillance system enables meaningful comparisons for injuries occurring in football for all ages, competition and training, gender, and over time period (Dvorak & Junge, 2015).

Implementation of F-MARC injury surveillance system

During the 1998 FIFA World Cup in France, the injury surveillance system was first implemented (Junge & Dvorak, 2013). A report about the use of F-MARC injury surveillance system during 12 international football tournaments; the World Cup 1998, the Women's World Cup 1999, the U-20 World Championships 1999 and 2001, the U-17 World

Championships 1999 and 2001, the Confederations' Cups 1999 and 2001, the Club World Championship 2000, the Futsal World Championship 2000, and the men's and women's tournaments of the Olympic Games 2000 showed an average response rate of 84% at these tournaments (Junge, Dvorak, Graf-Baumann & Peterson, 2004).

ii. Multi-sport events (IOC and IAAF) Injury surveillance system

In order to obtain reliable data on health or injuries and illness among athletes, in 2007, a standardized and feasible injury-reporting system for multi-sport events was developed (Alonso et al., 2009). Before then, it was difficult to get reliable, standardised data on athletes' health problems from different medical personal with a varying backgrounds meeting in a single tournament such as Olympic Games. A multi-sports injury surveillance system was adapted from the FIFA injury surveillance form. This system was evaluated during the 11th IAAF World Championships in Athletics in Osaka, Japan 2007 (Timpka et al., 2014; Alonso et al., 2009).

Implementation of Multi-sports injury surveillance system

The IOC conducted the first multi-sport injury surveillance study during the 2008 Olympic Games in Beijing (Junge et al., 2009). All the team physicians for single-sport and multi-sport events used the surveillance system. The injury surveillance system used during the event remained similar to that developed and used by FIFA. The team doctor reported daily match injury events on a single page for individual or team sports. From the two international multi-sports events (11th IAAF World Championships in Athletics in Osaka, Japan 2007 and the 2008 Olympic Games in Beijing, China), team doctors did not report any short comings in using the multi-sport injury surveillance system (Junge et al., 2008). Other international multi-sports events where the system has been used are: The Winter Olympic Games in Vancouver (Engebretsen et al., 2010); 2014 Olympic Games in Sochi (Nabhan et al 2016); London Olympic Games (Watura et al., 2013); the most recent one was the Rio de Janeiro 2016 Olympic Games (Soligard et al., 2017).

The IOC, International Paralympic Committee, International Sports Federations, National Olympic Committees have encouraged national federations of different sports to implement injury surveillance systems even at community levels (Van Mechelen, 1992;

Finch, 1997; Dvorak et al., 2006; Ekegren et al., 2014; Junge & Dvorak, 2015; Soligard et al., 2017).

iii. World Rugby Injury surveillance system

The first injury surveillance programme which was organised by the International Rugby Board (now known as World Rugby) started in 1995, during the International Rugby Union World Cup (Jakoet & Noakes, 1998). During that time, data were collected on the injury form administered prospectively by the match doctor. A limitation was that the system only reported match injuries and the data collection methods were not standardised making it difficult to compare subsequent research in rugby.

In 2007 a paper was published recommending standardising definitions associated with injuries in rugby (Fuller et al. 2007). These recommendations followed from their experience with the F-MARC Injury surveillance system (Fuller et al. 2006). The recommendations of that paper have been adopted and the definitions of injury are now used in all rugby surveillance projects, at all levels, including the previous three Rugby Union World Cups (Fuller et al., 2008; Fuller, Sheerin & Target, 2013). Currently, World Rugby considers injury surveillance studies a fundamental part of managing rugby player welfare (Press release, 2019; Fuller et al., 2017; Leahy et al., 2019).

iv. National level

As mentioned earlier, comprehensive injury surveillance systems are uncommon around the world (Ekegren et al., 2015). Examples of countries which have implemented various methods of comprehensive injury and illness surveillance are discussed below. A discussion on the definitions of injury and quality of injury data from these surveillance programmes is beyond the scope of this review.

United States of America

In 1974, the first national athletic injury/illness reporting system (NAIRS) was designed in United States of America (Powell & Barber-Foss, 1999). The programme was designed to monitor injuries among high school and college level sports participants. NAIRS initiated the establishment of other surveillance projects such as those associated with the National Football league, National Hockey League, the National Collegiate Athletic Association and National Athletic Trainers' Association project (Dick et al., 2009).

Further, there was also a public law 99-158 of Nov. 20, 1985, in the United States of America which sanctioned two institutions: the Centre for Disease Control and National Institute of Arthritis and Musculoskeletal and Skin Disease to develop guidelines for standardizing and monitoring youth injuries (Public Law 99-158, 1985). Based on the same background, a conference was organized in 1991 to develop guidelines so that the rate of youth sports injuries could be monitored. The outcome of this meeting resulted in youth sports injury surveillance systems. In 2015, a report showed that the United States of America had registered six injury surveillance systems (Ekegren et al., 2015).

- The National Football League's (NFL) Injury surveillance system
- The National Collegiate Athletic Association (NCAA) Injury Surveillance System Surveillance System
- The Fairfax County Public School System Injury Surveillance Database
- The National High School Sports-Related Injury Surveillance System
- Athletic Training Practice-Based Research Network (AT-PBRN)
- The Major League Baseball Injury Surveillance system

According to the current study project, four surveillance systems (Table 2.1) were selected to further understand their philosophies and significancy. These four systems only capture injury and illnesses resulting from participating in the sport of athletics, basketball, football and rugby. For all the four systems, the data are collected by athletic trainers in all the implemented injury surveillance systems (Table 2.1).

A recent report from the USA, has indicated that athletic trainer performs several duties, including providing medical support to athletes (Romero et al., 2018). This approach may be more pragmatic than a system which uses doctors or specialized health service providers such as physiotherapists to collect the data.

Table 2.1: Four injury surveillance system operating in the USA

System	Sports level	Years of operation	Who records data	How is data captured
NCAA	Multiple sports	1980 to date	Athletic trainer	Online surveillance system
National High School Injury system	Multiple sports	2005 to date	Athletic trainer	Online surveillance system
Fairfax County Public School	High school sports	1997 to date	Athletic trainer	electronic medical recording system
AT-PBRN		2009 to date	Athletic trainer	Online surveillance system

United Kingdom

There are three injury surveillance systems in rugby in England. The first surveillance system was commissioned in 2002 to monitor injury risks in the English Premier Clubs and England senior team (Roberts et al, 2013). The second surveillance project is the Youth Rugby Union Injury surveillance programme which started in 2006/2007 at Bath University. This surveillance system monitors injuries occurring in English premiership youth academies and senior school rugby union teams (Haseler & Carmont, 2010). The third surveillance project is the Community Rugby Injury Surveillance Project (CRISP) (Roberts et al, 2013; Roberts, Stokes & Kemp, 2019) which began in 2007 and is managed by the University of Bath. This surveillance programmeme collects injury surveillance data from a sample of amateur rugby players (Roberts et al, 2013).

Besides the rugby injury surveillance systems in England, there is also a multi-sport injury surveillance project designed to collect data from all elite athletes competing in Olympic sports. The programme was introduced in 2009 by Dr Debbie Palmer-Green at the University of Nottingham (Palmer-Green et al., 2013). The project is supported by Great Britain Injury/illness Performance Project (IIPP). The IIPP system uses team doctors to record injuries and illness, including performance restriction during training or game time. The injury data collection form was developed and validated by Great Britain Institute of Sport Injury/illness Performance project. Further, the IIP system does not use technology such as smart phone or web-based data capture systems. Nevertheless, without the use of such technologies, the surveillance system was successfully implemented during the study period [2009-2012] (Palmer-Green et al., 2013). Because of the 2009-2012 successful report

about the IIPP implementation, the Great Britain Injury/Illness Performance Project surveillance system approach was also used during the Sochi 2014 and Rio 2016 Olympic Games preparations.

The Republic of Ireland is another country which published data on its injury surveillance programme. The injury surveillance system tracks injuries and illnesses in Irish amateur rugby (IRISweb). The systems uses online methods, where data are recorded by either a team doctor or a physiotherapist. Yeomans et al (2019) evaluated the IRIS-web system in 2017/2018 by contacting physiotherapists, senior first team manager, the club's director of rugby, and the club's welfare officer to ask questions about the implementation of the system. The data showed that 91% of the amateur rugby clubs were monitoring player's injuries. Eight-two percent of the clubs rated IRISweb as 'good' or 'very good'. Also 53% of the medical staff, participating in data collection viewed the system's ability to collect quality data as "positive". All the participants recommended the system should be introduced to every amateur rugby club in the Irish republic. The barriers for implementing the IRIS-web programme were identified (Yeomans et al., 2018). The barriers were not due to the applicability of the system but rather to systems within the clubs in Ireland. The main barriers were player adherence (71%); availability of medical professionals at matches and/or training (24%); login issues (18%); access to internet (6%).

Australia

Before 1995, Australia had no sport-related injury surveillance programme (Finch, Valuri & Ozanne-Smith, 1999). Finch, Valuri & Ozanne-Smith, (1999) produced a report showing the designing, development and trialling an injury surveillance form during the two world sports events in Australia in 1997; the 1997 University Games, and VicHealth 5th Australia Master Games in Melbourne in 1997. Over 50 sporting codes participated in this trial. The authors of this paper-based injury recording system did not report any barriers for its implementation.

The injury surveillance form was subsequently adopted as the standardised injury data collection standard form for many major sporting events in Australia (Finch, Valuri & Ozanne-Smith, 1999). This injury surveillance programme is administered by the Monash University Accident Research Centre and Australia Sports Commission. Injury surveillance is now a part of medical coverage activities at every sports event in Australia (Finch & Staines, 2018; Orchard et al., 2013; Orchard et al., 2005).

FootyFirst is an Australian evidence-informed training programme under National Guidance for Australian Football Partnerships and Safety. The programme aims at reducing the risk of injuries in Australian football through research (Finch, 2011). A study was conducted on the five community Australian football leagues (n = 78 clubs) participating in this programme with the main aim to evaluate the clubs' adherence to the implementation of on-line injury surveillance programme (Ekegren et al., 2015). The report showed that 44% of the clubs adopted the programme, and about 23% of the clubs implemented the programme. Only 9% of the clubs could maintain the injury surveillance programme. The authors revealed that the end users did not clearly see the use of the injury surveillance as a way of preventing injuries, and improving sports performance and this was a barrier for maintenance. Other barriers included insufficient staff to conduct the exercises; under reporting of injuries to the trainer by athletes and the lack of leadership support. Also some coaches and club administrators did not allow the athletic trainer to get information from the athletes. The athletic trainers found the process of loading information time consuming, and sometimes technically challenging.

New Zealand

Freitag, Kirkwood & Pollock (2015), investigated international injury surveillance programmes their effectiveness and reported that New Zealand was the only rugby union playing country that had comprehensive injury surveillance systems that included exposure time and injuries occurring in matches and training for all levels of rugby (professional and amateur, adult and child). This can be attributed to the Accident Compensation Act of 2001 (Injury Prevention, Rehabilitation, and Compensation Act 2001, 2010). The Act includes several goals: "minimising both the overall incidence of injury in the community, and the impact of injury on the community (including economic, social, and personal costs". Further, the Act mandates organisations to measure all injuries, including injuries from sport (Freitag, Kirkwood & Pollock, 2015). Through this law, the Accident Compensation Corporation (ACC), which is a government agency, was established in 1974, to monitor all injuries including sports injuries. The ACC supports the New Zealand Rugby union on implementation of the data collection of the rugby injuries (Quarrie et al., 2019). In 2001 as a consequence of this collaboration, the New Zealand Rugby Union established a RugbySmart programme. The RugbySmart programme is designed to prevent or reduce the risks of injury in rugby union. There are several activities within the RugbySmart programme which target injury prevention. The programme implements injury surveillance and also provides

educational materials to coaches, referees, managers, health workers and athletes on safe techniques in contact phases of the game.

Norway

In Norway, an injury surveillance system was established in 2000 to monitor injuries in the professional football league (Bahr et al., 2002). In this system, the injuries are recorded on paper by teams' contracted medical staff. In 2007, a study assessed the accuracy of routine injury registration implemented by the medical staff in professional football clubs (Bjørneboe et al., 2011). The evaluation was done in such way that all contracted professional club players who participated in a full season were invited to participate in an interview by telephone. Other media sources (Facebook, newspaper, TV stations) were used to further cross-check the findings. The study showed that prospective recording is better than retrospective registration. For example, 30% of injuries were not reported by players during their interview. Also 19% injuries not recorded by the medical team. Further, the medical staff under reported the time-loss injuries. The study concluded that it is important to immediately record athletes' medical complaints into a web-based system. Secondly, the missing injuries in the records could have been due to many clubs having various categories of officials performing similar duties. Lastly, the study recommended introducing a medico-legal system in sports to support the recording of athletes' health.

Another study from Norway, investigated the feasibility of the electronic systems (SMS, Phone, and medical on-line injury surveillance system) to capture injuries that do not lead to time loss or medical attention (Møller et al., 2018). The electronic systems were able to capture and monitor athletes' injuries over the course of sports season (31- week). The study reported this system was feasible because of the quick and correct replies to all forms of question messages directed to the injured athlete. Besides, even when the athletes were re-checked using clinics where they were provided care, the same information concerning the injury was established. This further suggests electronic systems may provide another strategy for sports injury recording and documentation.

Injury surveillance systems in Africa

A literature search of the data bases: Ebscohost data bases such as PubMed, plus others like Google Scholar, and Science Direct using the following search term "injury surveillance systems" and (injury surveillance methods in Africa) and (comprehensive sports injury surveillance, Africa) did not reveal any national sports longitudinal injury surveillance

system. The only injury surveillance system found in Africa was operated by the South African BokSmart National Rugby Safety Programme. BokSmart injury prevention programme was launched in 2009 (Brown et al., 2015; Viljoen & Patricios, 2012). The programme implements best medical practices (evidenced sports medicine and exercise science research) in South Africa. This programme is supported by the South African Rugby Union and the Chris Burger/Petro Jackson Players Fund (Viljoen & Patricios, 2012). This fund was started after a rugby player (Chris Burger) died following a rugby match during which he sustained a catastrophic injury. The name of the fund was changed following the death of another player (Petro Jackson) a few years later. The injury surveillance programme collects injury data at every National Youth Week rugby tournament in South Africa, and has been doing so since 2010 (Starling et al., 2018). The BokSmart National Rugby Safety Programme also records all serious injuries during rugby sports participation (training or match time) that affect the head, neck and spine (Badenhorst et al., 2017). The injuries are recorded by a qualified doctor using a paper form method. The information on the injured player is later forwarded to the central BokSmart injury data system.

Injury surveillance systems in Uganda

The hospital-based trauma registries are the only injury surveillance system in Uganda (Kobusingye & Lett, 2000). No other injury surveillance system has been implemented since. The hospital-based trauma registry captures all injuries, but the majority sports-related injuries may not require a visit to hospital emergency departments. Therefore most sports injuries are not represented by this strategy.

Summary of surveillance of sports injuries

There is evidence that the international sports bodies under discourse (football, rugby and athletics) implement injury surveillance at professional and elite levels in an attempt to reduce injuries. There is also evidence that in some high income countries the injury surveillance systems are comprehensive. The strategy is applied to all sports and at all levels of sports participation (Ekegren et al., 2015; Freitag, Kirkwood & Pollock, 2015; Fuller et al., 2017; Leahy et al., 2019; Møller et al., 2018). However, in Africa, there is no such programme.

2.4.4 Sports related emergence care

The section describes sports emergency medical care in terms of best practices. The descriptions, and practices of emergency care principles are based on the literature available from four international sports bodies (IAAF, IOC, FIFA and WR), and sports expert groups, such as American and European sports medical societies (Harmon et al., 2019).

Introduction and background

Emergency medical care is the initial service provided to an acute illness or injury (Zideman et al., 2015). Emergency care, a term used inter-changeably with first aid care (Bull, 1997; Sumaiyah Jamaludin et al., 2018). In the context of best practice in sports, there are specific skills and technique required by a person in-charge of providing such services at this stage of care (Wascher & Bulthuis, 2014). These skills are demonstrated as the ability to recognize and assess the injury, determine limitations, and seek further care in the event of it being required. This suggests, it is mandatory for a first aider to develop specific skills associated with providing appropriate immediate care, while also activating emergency medical services (EMS) if necessary. Further, the ability/skill to make a decision often has to happen within seconds. For example, during a match, when a player gets injured, the emergency staff (physios, doctors) have about 20-30s to make an important decision while they are running on to the field.

During the emergency care phase following an injury, the goals are: to preserve life, alleviate suffering, prevent further illness or injury, and promote recovery (Dutch et al., 2008; Zideman et al., 2015; Wascher & Bulthuis, 2016; Whitaker, Cunningham & Selfe, 2006). The adequate and appropriate first aid care services improve clinical outcomes of any injury type (Hoque et al., 2017). Since the 2008 summer Olympic Games in Beijing, China the IOC and international sports bodies has made adequate and appropriate emergency care mandatory policy (Junge et al., 2009).

According to the conceptual frame-work on best practices in sports described above (Figure 2.3), the principle guidelines under the emergency care phase include:-

i. Shout for help; assess the scene; free from danger; evaluate the player (SAFE), (Guskiewicz & Broglio, 2015; Porter, Greaves, & Burke, 2016. Pp. 147), include primary survey.

ii. Transfer injured athlete out of field of play

iii. Side-line management (Include secondary survey (described above), resting or use of SCAT 3 for suspected concussed athlete; use ice in the event of reducing inflammation) (Guskiewicz & Broglio,2015).

iv. Recording/documenting of injury

v. Appropriate referral (Guskiewicz & Broglio, 2015)

The guidelines for emergency care contribute to promotion of health and safety of athletes during training and competition (Ching & Khalili-Borna, 2013; Zhang et al., 2011).

2.4.5 Intermediate care

The section describes intermediate care in terms of best medical practices in sports. The description and practices of intermediate care principles are based on international sports bodies, and clinical evidence-based information obtained from the expert groups or medical organisations. The studies evaluating athlete's medical care practices during intermediate care stage are reported and barriers are identified. Finally, rehabilitation and return-to-sports participation support team are presented.

Sports participation is commonly associated with time-loss injuries, and several authors use time-lost from sports or work to define the severity of an injury (Freitag et al., 2015; Gissane, Hodgson, & Jennings, 2012; Powel & Dompier, 2004; Williams et al., 2016). The time-lost may be reported as minimal (2-3 days); mild (4-7 days); moderate (8-28 days) and severe (>28 days). Sometimes it may be associated with career-ending, especially for the catastrophic injuries (Fuller et al., 2006). The time-loss injuries may require further medical care services beyond on-field medical practices. These injuries may need to be referred for further clinical evaluation (Powell & Dompier, 2004; Statuta & Pugh, 2019). For the current project, this stage of medical support is termed as an intermediated phase of medical care.

There are few published guidelines on the intermediate care principles from the international sports bodies and expert groups that are available in the literature. The reasons for the under-reporting of the guideline at this stage of medical practice have not been studied. The section below will present the few available guideline principles for sports health service providers.

The principle guideline during intermediate care stage

A study was conducted to assess the steps required for soft tissue injury management during the intermediate stage (O'Connor & Birrer, 2004). The highlights of this assessment demonstrated the need for absolute:

(a) Comprehenssive assessment for a clear diagnosis, there is also a variety of clinical and neuropsychological tests that have to be done to facilitate appropriate medical intervention (Bober, 2009; O'Connor & Birrer, 2004).

(b) Appropriate and adequate treatment care services to the referred athlete.

(c) The involvement of a multi-disciplinary team-work in accomplishing this process. Therefore, a qualified sports physician, nurses, physiotherapist, biokinetics or athletic trainers or gym instructor play an important role during this process.

(d) There should be an adequate increase in the fitness level, and controlling force loaded on the new tissue structures. This practices happens mainly at rehabilitation and return-to-sports participation stages.

The National Athletic Trainers Association (NATA) position on the conservative management of injuries recommends the application of evidence-based practices while performing the above principle guidelines (Kaminski et al., 2013). The association encourages member organisation to look out for the best practices on every item about the diagnosis such as the history taking, physical assessment, all the special tests and associated problems and radiological reporting is inherent best medical care practice in sports. Further, the adequate management should lookout for the best medical practices on cryotherapy, compression-therapy, and elevation, use of analgesics, promoting rehabilitation (range of motion, flexibility and strength building, including balance training. This should be followed by a return-to-sports activities.

Multidisciplinary team during intermediate care

During the intermediate stage, injury management requires a multi-disciplinary team approach (Bober, 2009; O'Connor & Birrer, 2004). The guidelines further recommend the first line of action to be from the sports physician who should establish the correct patho-anatomic diagnosis. The sports physician establishes the pathology of the injury through a comprehensive physical examination. This is followed by selective tests, including

radiograph imaging. Further, the rehabilitation that may include any other specialised physician, physiotherapists, orthotists, gym trainers and coaches is followed.

According to the IAAF, the sports medicine team is composed of professionals whose major responsibility is the health and safety of the athletes (IAAF-medical manual, 2012, part 2, Chapter 2). Figure 2.4 shows the sports medical team that may be available for consultation and management for an athlete's injury or illness during the intermediate and rehabilitation phase.

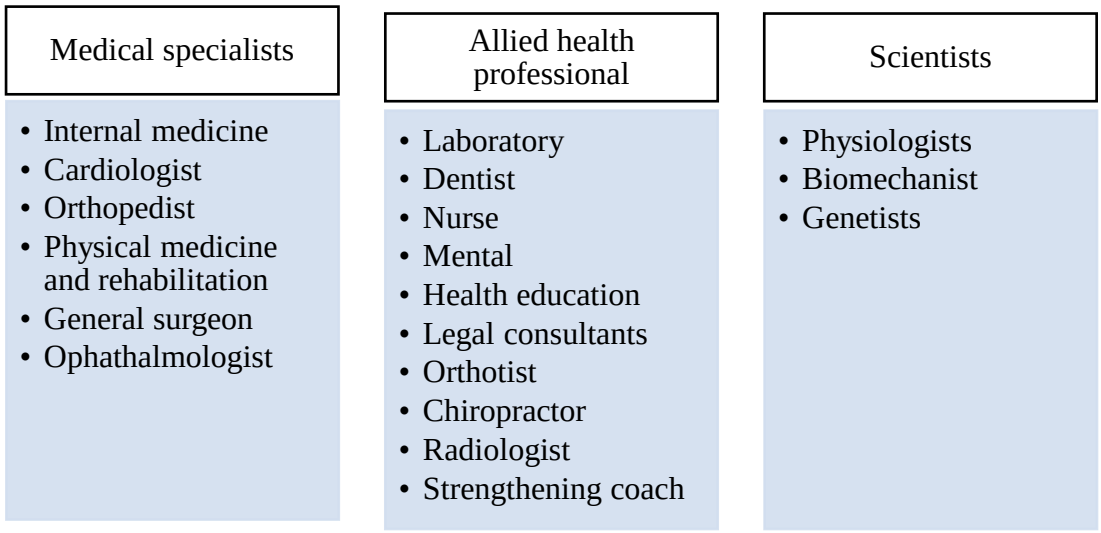


Figure 2.4: An illustration of the various health and medical professionals working in science

Despite the emphasis to have teamwork, there have been conflicting reports among the health services provider on each other's role and outcome during the intermediate stage.

2.4.6 Rehabilitation

The phase of rehabilitation involves increasing the level of fitness while controlling the forces loaded on the new tissue structures (Barh et al., 2012). Stracciolini et al (2007) highlighted one the main goals of this component of best practice model as to restore full range of joint movements, restore full muscle power and endurance and the overall function of the injured site. The IAAF recommends a system of guidelines should be in place to rehabilitate an injured athlete fully until when is fit to return-to-sports (IAAF-medical manual, 2012, part 2, Chapter 2)

Health care team

The rehabilitation item requires professionals that are sufficiently equipped to evaluate the athlete's injury history and compare it with the current situation to determine progress (Bober, 2009; O'Connor & Birrer, 2004). These professionals are required to guide the athletes on the length of time required for healing of specific tissue types/specific injuries (Statuta & Pugh, 2019). It was mentioned in the above section role of the sports physician and physiotherapists during subsequent injury phases after emergency care (Ching & Khalili-Borna, 2013). The two specialists are supposed to lead a multi-disciplinary team in prescribing; monitoring and evaluating athlete's fitness. In South Africa, a biokineticist who is trained to prescribe exercise is valuable during this stage (Chetty et al., 2014).

2.4.7 Return-to-sports

This is the final phase of the best practice model (Figure 2.3). This is the phase an athlete is prepared to return-to-sports participation. Although several steps are being taken to address the evidence on individualized injury return-to-play guidelines (Hollis et al., 2012; Sclafani & Davis, 2016; Zambaldi, Beasley, & Rushton, 2017). Some of the literature shows that the decision to allow the athletes to return-to-sports participation is still debated (Matheson et al., 2011). There are limited evidence-based recommendations regarding this process. Puddu, Giomani, & Selvanetti, (2001) notified that several rehabilitation team members have the opportunity to contribute to the decision making since the majority of return-to-play guidelines are expert opinion-based. The recommendation is to allow a multi-disciplinary team to expedite the process (Michener et al., 2018).

Professionals such as sports physician or physiotherapist adequately contribute to this process (Ching & Khalili-Borna, 2013). They lead the multi-disciplinary team because of the orderly medical requirements. New research is emerging that other disciplines, such as chiropractors (Salsbury et al., 2018), biokinetics (Chetty et al., 2014), and athletic trainers (Killinger et al., 2018) in some countries are well trained to decide return-to-sports participation.

2.5 UGANDA

2.5.1 Location and brief description of Uganda

Uganda is a land locked country in East Africa, about the size of the United Kingdom. It is known as the Pearl of Africa. The country was a former British protectorate and attained its independence in 1962. The total population of Uganda is almost 40 million, with the birth rate equivalent to four (4) or more childbirths per woman. The birth rate places Uganda amongst the countries with the highest birth rate in the world. The median age of the population is 15.9 years. This is the second youngest population in the world behind Niger (median age is 14.8 years) (World Economic Forum, 2016).

MAP OF UGANDA

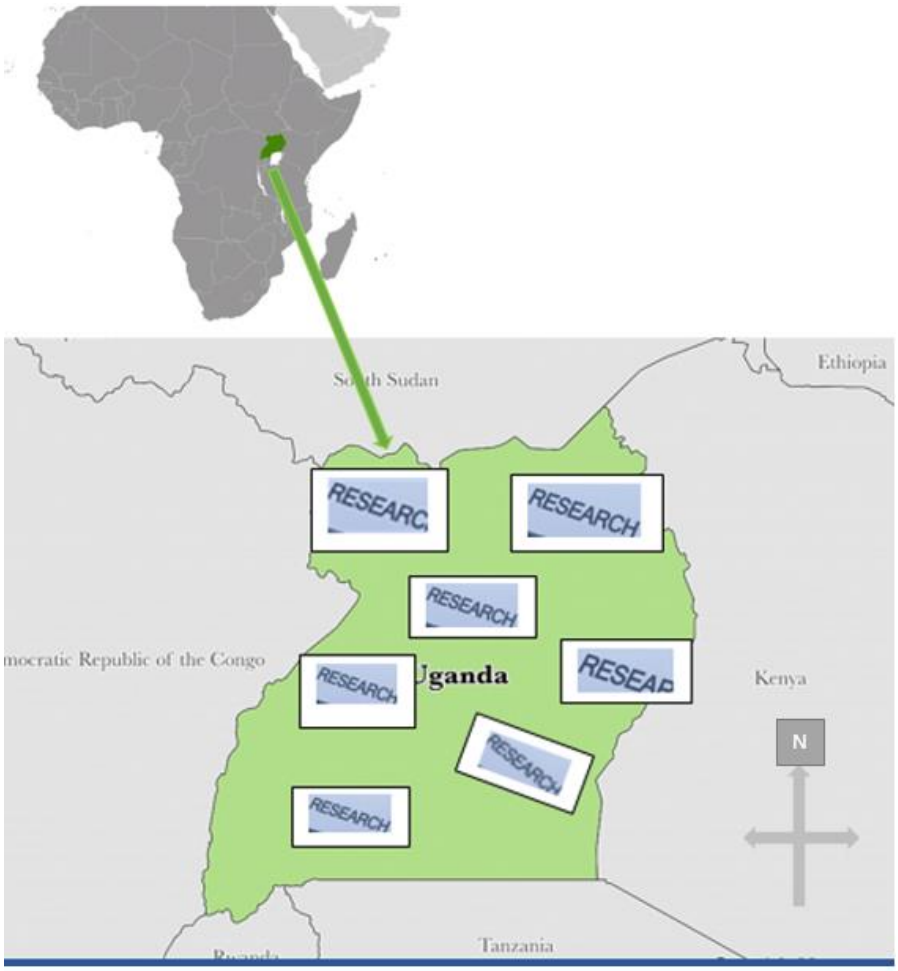


Figure 2. 5: Map of Uganda showing the areas covered while collecting project data for injuries, knowledge and practice, and facilities during the study

2.5.2 Country's global economic levels

The country is categorized as a low-income country according to the World Bank classification. The committee for developing policies at UN-economic and social council and UN-assembly classifies Uganda in the category of least developed countries. There are 48 countries within this classification in the world. In Sub-Sahara, Uganda, Rwanda, Somalia, South Sudan and Tanzania fall within this category (World Bank Data Team, 2019). Such countries, have the following characteristics:

1. Gross National Income (GNI) per capita is $1,025.
2. The population living below $2 is estimated at 47.2%.
3. Consistently lagging behind other developing countries.
4. Suffer from structural impediments to sustain development. Hence, they are characterized by high vulnerability to economic and environmental shocks and a low level of human supplies.
5. Less awareness regarding matters of health.
6. Poor amenities (facilities), shortage in water supply, shortcomings in the area of medical supply.
7. A higher rate of birth rate, poor nutrition and source of food.
8. Low level of education and an overall shortage of skills to organize and manage development
9. Lack of adequate physical and institutional infrastructure for development
10. Economically small (by population or national income), undiversified natural resource base.

In Uganda, poverty is the main challenge in the health and education sector. Other associated factors include: the high prevalence of communicable disease, and emergence of diseases due to lifestyles. The trauma cases are also increasing due to unplanned infrastructure. There is also inadequate distribution of social service amenities, and the general level of underdevelopment of social services (Naddumba, 2008). The government of Uganda increased their spending on public basic services, from 1987 immediately after the end of liberation war of 1986. Despite significant improvement in the budgetary allocations

to facilities, such as hospitals, schools and agricultural institutes and basic service delivery in areas of health and education, the priorities are not recovering substantially. This could be due to challenges at various levels of government. Such as the lack of technical experts, and the challenge of the quality administrative structures (Owori, 2018).

2.5.3 Education and sports development

At present, sports are managed by the Ministry of Education and Sports. Voluntary Missionary Organizations first initiated formal education in Uganda during the colonial period, in the early 1880s (Maksymenko & Tranfaglia, 2015). In 1922, following the Phelps-Stokes Fund report (Lewis, 1962), the government of Uganda started having an active role of exercising control over education.

By the 1950s and 1960s the quality of education was at its peak in Africa, with better education and sports infrastructure. This was due to a large number of foreign experts in the various fields such as: Agriculture, medicine, education and natural resources conservation, who were based at Entebbe the capital city of Uganda that time. This was also reinforced by the work of the local workforces that is the authorities and the enthusiastic community (Baker & Wiseman, 2009; SSekamwa, 1997, 245 p)

Between the period of 1970s and 1980s, there was a decline in education, and sports activities. This was due to civil strife and expulsion of foreign nationals. This was accompanied by demoralized human resource, corruption and vandalism of public facilities including sports facilities by businesspeople. This affected the work force, and the implementation and maintenance of quality education, and sports infrastructure became difficult then (Zerkle, 2009).

In late 1980s and 1990s, the present government emphasized general recovery and rehabilitation of education work force and infrastructure to restore functional capacity. The government appointed the educational policy review commission of 1987. The appointed committees, and taskforces were asked to review the prevailing situation and report to the government authorities. This resulted in a supreme paper of government “the Government White Paper” (GWP). This was used as a guide on the purpose and programmeme of education and sports sector. It later became the Education Sector Investment Plan (ESIP 1998-2003, 2004-2015), and a macro-structure plan. This added several departments to the Education sector including the department of physical education and sports.

Now, sports in Uganda have several roles for the inhabitants. Firstly, sports address the issue of non-communicable diseases (Kirunda, Fadnes, Wamani, den Broeck, & Tylleskär, 2015; Schwartz, Guwatudde, Nugent, & Kiiza, 2014). Secondly, sports are used as an intervention to improve mental health (Richards, Foster, Townsend, & Bauman, 2014) and, thirdly sports improve the quality of life of people with disability (Shapiro, & Malone, 2016). Therefore, an increase in physical activity and sports participation in Uganda is noticeable. Sports are legalized activities in Uganda and protected by the laws of Uganda (Constitution of the Republic of Uganda, 1995).

2.5.4 Sports governance in Uganda

The Uganda National Council of Sports (NCS) Act of 1964 is an act of parliament that established the National Council for Sports (NCS). This is a statutory organ under the Ministry of Education and Sports. The role of NCS is to develop, promote and control all forms of amateur sports on a national basis, with the help of volunteering sports associations and federations.

In 1997, the Department of Physical Education and Sports was established in the Ministry of Education and Sports (Ministry of Education and Sports, 2014). This came about as; - there was a lack of a specific body/division to handle sports related programmes independently. Currently, the Department of Physical Education and Sports (PE/S) and National Council of Sports (NCS) support amateur sports programmes on behalf of the government, whereas the Uganda Olympic Committee (UOC) have the mandate to govern all elite sports. The UOC is the national representative for the International Olympic Committee (IOC). Therefore, Uganda Olympics Committee is responsible for; - developing, promoting and supporting the elite athletes in all the sporting codes recognized by International Olympic Committee (IOC). The two bodies (NCS and UOC) are facing numerous problems, including health care of the athletes (personal discussion with the executive member, 2018).

Whereas there has been support and training of qualified and registered health workers, since 2014 by the Uganda Olympics committee, assisted by the Red Cross organization, the trainings focused only on sports doping, sports injury management and child drowning first aid. Therefore, studying the implementation process of international sports health care policies which are included in the best medical care strategies, published by international sports authorities and considering Uganda as a case is timely idea. Besides,

there is critical need to improve sports in Sub Sahara Africa in all areas, including health and safety (Chisati, Nyasa, & Banda, 2016).

CHAPTER 3:

MANAGEMENT OF SPORTS INJURIES IN UGANDA

3.1 INTRODUCTION AND BACKGROUND

Reports about the well-being of athletes, specifically health care have become a common theme in the global and local media (Freitag, Kirkwood & Pollock, 2015). In Uganda, there is currently no published data on medical care behaviours in sports. Therefore, the main aim of this study was to report on sports injury management behaviour in the four sporting codes (athletics, basketball, rugby and football) in Uganda.

3.2 RESEARCH QUESTION

What are the sports injury management behaviours in the four sporting codes in Uganda?

3.2.1 Specific objective

To track and document injury management behaviours among athletes representing the four sports in top level clubs, until they return to full participation.

3.3 METHODOLOGY

3.3.1 Research setting

The study was carried out in the four major sporting codes in Uganda, namely: football, basketball, athletics and rugby football. These are sports with a maximum number of participants. And evidence suggests, as the number of participants increases, the likelihood of different injury profiles to increase (Kahlenberg et al., 2016).

The four sporting codes under investigation a part of the Olympic Games. Rugby Sevens was included in Olympic Games for the first time in 2016. The NCS and UOC work with the various sports associations and federations, such as the Federation of Uganda Football Association, Federation of Uganda Basketball Association, Uganda Athletics Federation and the Uganda Rugby Union.

i. Uganda Athletics Federation

Uganda Athletic Federation (UAF) is the national governing body of the Athletics, under the rules and regulations of IAAF. During colonial times (1925), it was called Uganda National Athletics Association (UNAA). The UNAA in 1954, became affiliated to IAAF, and African Athletics Confederation (AAC), subsequently, the Eastern African Athletics Region (EAAR). At the time of independence (1962), it had changed to Uganda Amateur Athletics Association (UAAA). In 1993, it then became the Uganda Amateur Athletics Federation (UAAF). After the professionalization of athletics in Uganda in 1997, the body changed to UAF (Heritage, 2018).

The UAF is responsible for developing and promoting track and field sports in Uganda aligned to the IAAF statutes. Membership is only attained as a club or a district association of athletes. Currently, there are 39 registered members with the federation throughout the country. After becoming an athletic federation in 1997, it embraced all the components/themes of professionalism in sports. Each membership is supposed to have a manager, a qualified athletics coach, and team doctor or a health professional. The number of athletes may vary from 15 to 400, depending on the resources for/in the camp. The UAF does not have a record of the number of all athletes in Uganda therefore, it was not possible to estimate the percentage of the population of athletes studied.

ii. Federation of Uganda Basketball Associations

The Federation of Uganda Basketball Association is the current governing body of the sport of basketball in Uganda. It was officially affiliated to the Federation of International Basketball Association (FIBA) in 1963 (Profile/FIBA.COM, 2018). It belongs to FIBA Africa Zone V, one of the most active zones in Africa (FIBA women's Afrobasket, 2019).

The federation is in charge of the development and organization of basketball in Uganda, and manages the largest league in Africa, with 68 teams in five divisions (men's Airtel National Basketball League (ANBL), Division One League (DOL) and The Development League (TDL), the women's ANBL, and women's DOL. It contributes to the development of basketball in schools is by partnering with School Basketball Associations (SBA). Furthermore, it provides technical support such as referees and equipment during school's basketball competition. It has both men and women elite teams, and their position in Africa is very competitive. According to the basketball rules, each team must have a manager

and a coach, and because of the scarcity of qualified medical personnel, the federations provide medical care only during the international, regional and national events, and it's not a rule for each team to have their own medical personnel (Meeting the administrator, 2015).

iii. Federation of Uganda Football Associations

The Federation of Uganda Football Associations (FUFA) is the governing body of football in Uganda. It was founded in 1924, and became affiliated to FIFA in 1960, subsequently becoming a CAF member in1961 (FUFA, 2019). Among other responsibilities, its major aim is to organise men and women's national football teams. The FUFA men's team is currently the East and Central Africa's champion and qualified for the African Cup of Nations (AFCON) that was held in Gabon January 2017.

Currently, they are 962 clubs registered with the first division to 5th division (district level). However, it is only 16 clubs that participate in the super league (Azam Super League) whose players comprised of the study population during the investigation. Each of these 16 clubs, it is a rule must have 28 players, and a health worker. Therefore, an estimate of football player population of was 448 registered in the top league (Azam Super League) (FUFA, 2020).

iv. Uganda Rugby Union

The Uganda Rugby Union (URU) is the sport's governing body of the sport of rugby in Uganda. In 1955, the Uganda Rugby Football Union (URFU) was formed. It is now called Uganda Rugby Union (URU), affiliated to World Rugby since 1997. In 2000, the union joined the Confederation of African Rugby Union (CARU). There are several organisations affiliated with the union including the medical society, referee's society and the women's association and the school’s association. The union has elite teams such as men and women fifteen's team, men and women seven's team and under-nineteen team. The above teams compete in CARU, WR, Elgon Cup (EC), East Africa Super Series (EASS), and many other regional competitions. (An interview with the excutive director, 2015).

In the early 1930s, there was only one rugby club in Uganda called the "Uganda Rugby Football Club", which later became "Uganda Kobs Rugby Football Club". There are currently 27 registered clubs while 11 of the clubs play in the elite league and other 16 are playing in the lower division league. By the rules and regulations of the URU, each of these

clubs must have a manager, a coach and health care personnel. Currently, there is an an estimated population of 14110 players in Uganda (Uganda national rugby union team, 2017).

3.3.2 Population of the study

The study was conducted among athletes from the four sporting codes mentioned above. In this context, participants had to fulfil these criteria; be training in sports aiming to improve his/her performance or results; be actively participating in sport training or competitions; have been formally registered in a local, regional or national sport federation as a competitor; and to have sport training and competition as his/her major activity or focus of interest, almost always devoting several hours in all or most of the days to these sporting activities, exceeding the time allocated to other professional or leisure activities (Araujo & Feller, 2016). Football sporting code was estimated to have 448 players, rugby sporting code was estimated to have 1411 players, basketball is estimated to have 884 registered players and there were no estimates for athletics sporting code. Each district, club or camp had a varying number of athletes ranging from 15 to 400 athletes.

Sample population

The goal was to identify 20 cases of injured athletes from each sporting codes during training or competition and use them as a case study to analyse injury management behaviour. However, only 94% injured athletes fully completed the study period. The major reasons for the lost 6% were due to financial constraints and failure to continuously obtain information to return-to-play or retirement from sports.

3.3.3 Design and methodology

This design was a prospective cohort study, utilising quantitative methods to establish and document injury management behaviour for a period of one year. The study was classified as descriptive as it aimed to achieve insight into the sports injury conditions.

Development and layout of research instrument

The data extraction tool (collecting details about injured athletes) was developed by the researcher guided by the supervisor of the project. The development of this tool used items from the conceptual model. This model had been developed from the literature reviewed on medical care in sports. The items were identified from a review of sports medical care manuals published by international sporting bodies' websites, but also from other medical

sports scientific journals. These manuals included: the IOC medical commission guidelines for reducing doping (IOC medical commission, 2013); the IAAF medical manual (Alonso, 2013) guidelines for protection and management of player's health; the FIFA F-MARC (FIFA-Player's health, 2013) on pre-participation evaluation of athletes and the IRB-guidelines for Player's welfare (IRB-Player's welfare, 2013). In addition to this, other items were obtained from Boksmart injury surveillance tool (BokSmart, 2013).

The research tool (questionnaire data extraction sheet) had five sections. The questionnaire was presented to a sports injury prevention scientific group for discussion. The corrections and feedback were incorporated into the revised tool.

The final questionnaire had sections including a demographic section (with items such as: age, sex, date of birth, sporting code of the athlete, camp or clubs/he belongs to and position or discipline of the athlete within the team), and an injury preventive section (with items such as medical insurance, pre-participation medical examination and periodic health evaluation). The acute management section had items such as: the first aid given, injury record, transfer techniques, first aid service provider, and whether there was a referral. The intermediate section had items such as: physical and medical tests, service providers, type of treatment given and area of treatment. Lastly, the rehabilitation and return-to-sports participation section had items such as: specialist in charge of rehabilitations, rehabilitation period and return-to-sports participation clearing officer.

Data collection procedure

This study was part of a large project investigating the implementation of best medical care practices in sports in Uganda among the four major sporting codes.

Before the study, we obtained ethical clearances from both South Africa and Uganda. From South Africa, it was obtained from the Faculty of Health Science Human Research Committee of the University of Cape Town. In Uganda, a review was undertaken by Makerere School of Public Health (MakSoPH) ethical committee board and later recommended the protocol to the Uganda National Council of Science and Technology (UNCST). The UNCST is a national ethics committee responsible for clearing all research protocols in the country. The final clearance was obtained from UNCST to conduct the study in Uganda. After the ethics research committees, permissions were sought from the Uganda National Council of Sports (UNCS), Uganda Olympic Committee (UOC) and from the four federation management boards. The UNCS and UOC were approached specifically to get

permission to approach the federations since they are governed by UNCS on behalf of the government and UOC on the behalf of the IOC respectively. The federations' management granted permission for us to approach clubs and sports camps.

After introducing the research assistant to the federation officials, we provided a background of the study and its benefits to the respective federations (FUFA, URU, FUBA and UAF). The minister of state for sports had earlier communicated through telephone to the four federations about the study and highlighting the benefits of the investigation. This is was because some federation had failed to recognise the appointments from the research team. At the federation offices, we were given details of the responsible officials for various clubs or camps registered with federations and their phone contacts. We could not contact the coaches and managers by emails because the federations lacked email contacts of coaches and athletes except for only top management officials. Secondly, internet services were only available and utilised by clubs or camps in the city compared to upcountry clubs or camps. In addition, due to power scarcity (daily load shedding), the clubs or camps managers could not keep the smart phones in the up-country areas.

In the sport of athletics, athletics camps management officials were approached, and given details of the study. They were 39 camps in total which were registered within 49 districts of Uganda by that time. Since we had details of phone contacts for districts athletic officials and coaches, we often called four days before and scheduled meetings to conduct research in those respective districts throughout the country. We attended training in the mornings, but in other districts, athletes trained in the evenings; we also had to attend to their training. It was challenging to identify a time loss injury in the sport of athletics situation (owing to the financial constraints already the research team was facing). Therefore, several days were spent upcountry. However, other investigations which were part of a larger project (Chapters 4 and 5) were carried out to utilise the time effectively.

Once an athlete got injured, a consent form was presented to the athlete. And we were available for any questions before the athlete signed. Then after, we collected information on the first two sections of the questionnaire (demographic information and acute injury management information) through a personal contact with the athlete. The details about the athletes and injury were then entered direct into the excel spreadsheet on our computer but also kept same information in a research book available with us. Finally, we requested the consented athletes to accept our daily calls for the next 15 days, and weekly a call after 15th

day until his or her return-to-sports participation. For the semi or unconscious athletes, we relied at first on his or her coach or managers. For those camps or clubs who had medical officers, we relied on the medical officer for contact details and other demographic variables. Due to the scarcity of medical personnel in athletics federation, at times we even provided first aid before we issue out research materials to the athletes. In these cases we recorded no first aid care as the data entry. One set of data was always left in our hotel on an external hard drive, and other two sets data were kept on our laptop and in the log-book.

For the sport of rugby, after meeting and obtaining permission from the federation management officials, we scheduled meetings with the management of various clubs who provided us with details regarding training and matches for their clubs. A sevens rugby national team selection tournament took place during this time, so the research team utilised this opportunity. The tournament lasted for two weeks and was during the Saturdays and Sundays. All top clubs in the country presented the sevens team for the competition. During the tournament, we introduced ourselves to the tournament medical team, including the tournament doctor. We provided details of the study to the tournament doctor and joined the emergency medical team for the collection of injury data. The technique of collecting injury information and type of information has been explained above. We relied on the coach and friends on the field for any concussed or unconscious players and contacted the player the following day.

In the case of football, the research team conducted the study in two seasons. This was due to the ethical clearances and federation permission procedural time. The processes of accessing the club management and participants have been explained in the above paragraphs. The club management gave us permission to attend training and match sessions for the respective clubs. The time and dates for the training or matches were provided to us by the coaches. Ninety-five percent of top clubs playing in the top national league were within the town, or within a radius of 40km from the capital city. There was less burden of travelling up-country for matches or training sections for this observational research. Details of approach and data collection have been explained in the above paragraphs.

For the case of basketball sport, the federation administrator provided contact details of the coaches for the various teams and match days. The details of coaches helped to keep track of training schedules for the teams since they were spread out in the country. A total of 68 basketball clubs were registered with the federation. The teams' training were spread from

Monday to Friday. Most of the teams shared venues. The city venues could be used by 2-4 teams a week. Saturdays and Sundays were the match days. However, some matches were scheduled on Fridays. The research team could collect injury data during training and matches. However, fewer injuries were recorded during training sessions, but being part of the bigger study, the research team was present during training for reasons given in the above paragraphs. The procedure of getting information from the injured athletes, recording the information and protecting the information has been explained above.

3.3.4 Ethical considerations

The researcher travelled to Uganda to conduct research. After obtaining ethical clearance from the Faculty of Health Science Human Research Committee (HRECREF: 584/2014), University of Cape Town. For any foreign research protocol, it is a requirement from Uganda National Council of Science and Technology (UNCST) to seek approval from the recognised national ethical boards before obtaining a national clearance through UNCST. Then further ethical clearance was sought from Makerere University School of Public Health (MakSoPH protocol 242). Then also the UNCST cleared the research protocol (Ref: SS3626) to be carried out in Uganda. Further permissions were sought from various sports management officials as explained above before approaching the participants.

Prior to the collection of data, written information on the study and its aim as well as a consent letter was given to each participant. Those who accepted to take part in the study were asked to sign an informed consent form provided by the researcher. Participation was voluntary and any participant had the liberty to withdraw from the study at any time. Participants were assured of the strict confidentiality of the information provided. We usually kept data with a password, and we assured the participants if we write a report or article about the research findings, the identity of the participant was to be protected to the maximum extent possible, in addition to the information provided. We further assured the participants that the research findings will be made available to all the relevant stakeholders (details of the ethics approval papers can be found from Appendix 9-13).

3.3.5 Data analysis

At the end of the research period, 125 sports related injuries were collected from 98 athletes from the four sporting codes. However, after data cleaning, of the 125 sports time-loss injuries collected from 98 athletes, only 75 injuries were used for analysis from 60

athletes. The 75 sports related injuries were further analysed and condensed into 9 injury conditions (abrasions, contusion, concussion, laceration, fractures, others, strain and sprain). Stata 14 (StataCorp LLC, 4905 Lakeway Drive College Station, Texas 77845-4512, USA) was used to determine the frequency for all the variables.

3.3 RESULTS

3.3.1 Demographic information of the participants

Seventy-five-time loss-injury (n=75) were identified and recorded, the Table 3.1 below summarizes the participant's demographic data (average age, gender frequency), and the sports injuries recorded from each sporting code.

Table 3.1: Demographic information summary of the injured athlete (n=75)

Sports codes	Age (years)	Gender	Time-loss injuries
Athletics	22.8 ± 2.5	F =6	16
		M =10	
Basketball	27.8 ± 4.4	F =10	25
		M =15	
Football/soccer	21.7 ± 3.1	F =0	11
		M =11	
Rugby	23.1 ± 3.0	F =2	23
		M =21	
		F = 18; M = 57	**75**

Age expressed as mean ± standard deviation; F = female, M = male.

3.3.2 Injury condition outcome

Of the 75 sports related injuries, 9 conditions were summarized and are presented as case studies. The other conditions; fainting, contusion, and dislocation were each recorded once. Concussion and fracture conditions were each observed and recorded from three athletes. Four athletes reported with lacerations during the study period. Nineteen athletes reported with strains and 41 athletes reported with sprain (Figure 3.1).

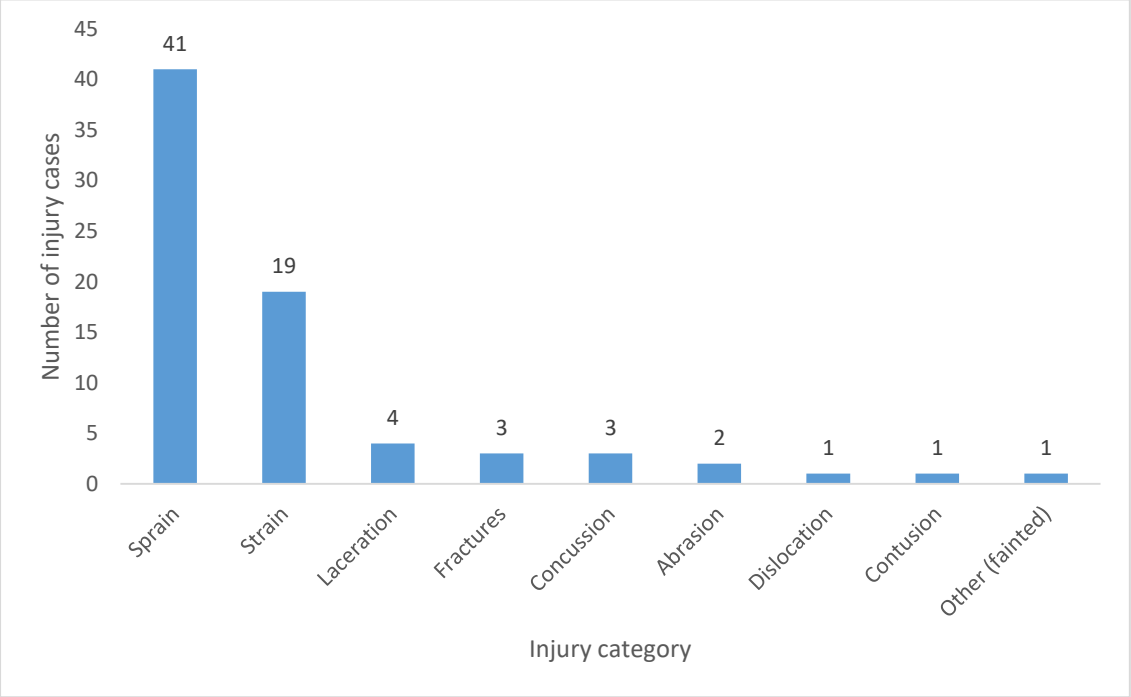


Figure 3.1: Summary of injury category, and number per type of injury

3.3.3. The medical care services provided to athletes with the injury (Figure 3.1 above)

Introduction

The section below shows the results of the observed medical care services, and the follow-up telephonic interviews of the injured athletes' treatment in subsequent six months.

a. The injury medical preventive strategies (preventive phase)

Only one injured athlete out of the 75 had a pre-participation assessment (PPHE) (Table 3.2). This athlete has a strain injury. None of the other injured athletes had a pre-participation evaluation.

Table 3.2: The athlete's medical prevention strategies employed

Injury condition	**Yes to PPHE (n=1))**	**No to PPHE (n=74))**
Contusion	-	1
Abrasion	-	2
Laceration	-	4
Fainted	-	1
Concussion	-	3
Strain	1	40
Sprain	-	19
Dislocation	-	1
Fractures	-	3

b. The on-field medical care of the injured athletes (emergency phase)

The majority of the injured athletes did not receive medical attention on the field, except for the athlete who fainted, and a few of the athletes who had sprains (n=3) and strains (n=4) (Table 3.3). Further Table 3.3 indicates that no athlete had the injury details recorded (Table 3.3). In addition, many of the athletes (n=60) were not referred for further medical evaluation.

Table 3.3: The on-field medical services provided by health service providers

Injury conditions	Emergency care phase		SAFE on FoP		Removal from FoP		Side-line service		Injury recording		Referred conditions	
	Yes (n=53)	No (n=22)	Yes (n=12)	No (n=53)	Yes (n=59)	No (n=16)	Yes (n=45)	No (n=30)	Yes (n=0)	No (n=75)	Yes (n=15)	No (n=60)
Abrasion	2	-	-	2	2	-	1	1	-	1	-	1
Concussions	3	-	-	3	1	2	2	1	-	3	2	1
Contusion	1	-	-	1	1	-	-	1	-	1	-	1
Dislocations	1	-	1	1	1	-	-	1	-	1	1	-
Lacerations	4	-	-	4	4	-	4	-	-	4	1	3
Fainting	1	-	1	-	1	-	-	1	-	1	1	-
Fractures	3	-	3	3	3	-	2	1	-	3	1	2
Sprain	26	15	3	38	36	5	26	15	-	41	6	35
Strain	12	7	4	15	10	9	10	9	-	19	3	16

SAFE: Shout out for Help; assess the scene; Free from danger; Evaluate the injured athlete. FoP: Field of Play

Field of play treatment modalities

In examining the treatment modalities, the medical teams had some level of awareness on the usage of variety treatment modalities such as ice, bandages, and painkiller (sprays and tablets) (Table 3.4). However, the services were not consistent to all the injured athletes.

Table 3.4: Treatment modalities commonly used during emergency care (on-field care)

Treatment modalities	Abrasion (n=2)	Concussion (n=3)	Contusion (n=1)	Dislocation (n=1)	Faint (n=1)	Fractures (n=3)	Lacerations (n=4)	Sprain (n=41)	Strain (n=19)
Ice	-	-	-	-	-	-	-	14	4
Ice & bandage	-	1	-	-	-	-	3	6	2
Ice & Massage	-	-	-	-	-	-	-	-	2
Ice & Spray	-	-	-	-	-	-	-	1	-
Ice & Resting	-	-	-	-	-	-	-	-	1
Ice, Massage & Bandage	-	-	-	-	-	-	-	1	-
Painkillers	-	-	-	-	-	-	-	1	-
Immobilization	-	-	-	-	-	-	-	1	-
Bandage only	-	-	-	-	-	-	-	-	1
stretch exercises	-	-	-	-	-	-	-	1	-
spray & massage	-	-	-	-	-	1	-	1	-
Water	1	-	-	-	-	-	-	-	-
Arm sling	-	-	-	-	-	2	-	-	-
Wound dressing	-	-	-	-	-	-	1	-	-
SCAT3	-	1	-	-	-	-	-	-	
No service	1	1	1	1	1	-	-	15	9

c. Medical care strategies after 48 hours (Intermediate phase)

In evaluating the intermediate phase of medical care, the results revealed that 61% (n=47) of the injured athletes went for further medical care (Table 3.5). The rest of the athletes (n=28) did not seek for any care at this stage. These athletes that sought further care in the medical facilities, mentioned they were managed conservatively (no one had to undergo any form of surgery) (Table 3.5).

Table 3.5: Intermediate phase: management approach to the injury at the emergency departments in the hospitals

	Intermediate care phase		**Conservative approach**	
Injury condition	**Yes (n=47)**	**No (n=28)**	**Yes (n=75)**	**No (n=0)**
Abrasion	1	1	2	-
Concussions	1	2	3	-
Contusion	-	1	-	-
Dislocations	1	-	1	-
Lacerations	3	1	3	-
Fainting	1	-	1	-
Fractures	2	1	2	-
Sprain	26	15	26	-
Strain	12	7	12	-

The investigative modalities

Table 3.6 illustrates investigative modalities utilised to address the injury situations of the referred athletes. The investigative modalities presented to athletes at various medical centres included the Computerized Tomography (CT)-Scan, Magnetic Resonance Imaging (MRI), physical assessments, diagnostic Ultra-sound and the x-rays (Table 3.6).

Table 3.6: The medical centre investigative modalities

Health facility services	Abrasion (n=2)	Concussion (n=3)	Contusion (n=1)	Dislocation (n=1)	Faint (n=1)	Fractures (n=3)	Lacerations (n=4)	Sprain (n=41)	Strain (n=19)
CT Scan	-	-	-	-	-	-	-	-	1
Diagnostic x-rays	-	-	-	-	-	2	-	3	2
Diagnostic U/S	-	-	-	-	-	-	-	3	3
U/S Scan & Physical assess	-	-	-	-	-	-	-	2	-
Diagnostic MRI & Scan	-	-	-	-	-	-	-	1	-
Diagnostic MRI & x-ray	-	-	-	-	-	-	-	-	1
Diagnostic MRI & x-ray	-	-	-	-	-	-	-	-	1
Diagnostic MRI	-	-	-	-	-	-	-	1	-
Physical assessment	-	-	-	-	-	-	-	3	1

The treatment modalities

The treatment modalities available for injury at this stage included the casting materials, medication, orthopaedic manipulations, and ice-therapy and wound dressing materials (Table 3.7). The majority of the athletes were treated without qualifying for further investigations (Table 3.7). The concussed athlete at this stage was advised to continue to rest, while the athlete who fainted was provided with medications only.

Table 3.7: The treatment modalities used at the medical centres

Health facility services	Abrasion (n=2)	Concussion (n=3)	Contusion (n=1)	Dislocation (n=1)	Faint (n=1)	Fractures (n=3)	Lacerations (n=4)	Sprain (n=41)	Strain (n=19)
Wound management	-	-	-	-	-	-	2	-	-
Casting (Plaster of Paris)	-	-	-	-	-	1	-	-	-
Medications (Antibiotics, anti-fungal & Analgesics)	-	-	-	-	1	1	1	1	-
Correction shoulder dislocation	-	-	-	1	-	-	-	-	-
Advised to rest	-	1	-	-	-	-	-	-	-
Ice-therapy	-	-	-	-	-	-	-	5	5
Heat-therapy	-	-	-	-	-	-	-	4	-
Massage therapy	-	-	-	-	-	-	-	12	7
No treatment	2	2	1	1	1	1	2	29	11

d. Rehabilitation

The results show the avaialable specialists for athletes' injury rehabilitative (Table 3.8). Apart from athletes who were either sprained or strained, none of the other injured athletes were observed by the key health specialists (sports physician, doctor, physiotherapists).

Table 3.8: The athletes' preferred specialist during intermediate and rehabilitation stage

Specialists	**Conditions**								
	Abrasion (n=2)	**Concussion (n=3)**	**Contusion (n=1)**	**Dislocation (n=1)**	**Faint (n=1)**	**Fractures (n=3)**	**Lacerations (n=4)**	**Sprain (n=41)**	**Strain (n=19)**
Physiotherapist	-	-	-	-	-	-	-	16	3
Coach	-	-	-	-	-	1	-	4	3
Doctor	-		-	-	-	-	-	-	3
Instructor & doctor	-	-	-	-	-	-	-	-	1
Coach & physiotherapist	-	-	-	-	-	-	-	1	1
Coach, instructor & Physiotherapist	-	-	-	-	-	-	-	-	1
Physiotherapist & instructor		-	-	-	-	-	-	1	1
No care	2	3	1	1	1	2	4	19	6

e. Return-to-sports participation

Majority of the athletes made personal, non-medical decisions to return-to-sports participation (Table 3.9). The athletes who were concussed, had contusions, or fainted were self-cleared. By the end of the study period, there were some athletes who had not yet decided to return-to-play or hadn't been cleared.

Table 3.9: Source of permission to return-to-sports participation (n=75)

Clearance	**Abrasion (n=2)**	**Concussion (n=3)**	**Contusion (n=1)**	**Dislocation (n=1)**	**Faint (n=1)**	**Fractures (n=3)**	**Lacerations (n=4)**	**Sprain (n=41)**	**Strain (n=19)**
Coach	-	-	-	-	-	1	1	1	1
Her/himself	2	1	1	1	1	1	2	25	10
Nurse	-	-	-	-	-	-	1	-	-
Physiotherapist	-	-	-	-	-	-	-	10	2
Doctor	-	2	-	-	-	-	-	-	4
Not yet	-	-	-	-	-	1	-	5	2

3.4 SUMMARY OF STUDY ONE

This study identified injuries (n=75) from participation in athletics, basketball, football and rugby and then tracked their management. These events included any preventative measures, immediate care after injury (acute phase), the treatment that followed after on-field care (intermediate phase), the rehabilitation and return-to-play protocols. The goal was to identify barriers which detracted from providing best medical care services to the athletes. The findings of the study are summarized according to the model components/themes as previously described in literature (Figure 2.3).

Preventive care measures

The preventive care stage determined two check points: (i) whether the athlete had had pre-participation health evaluation ((PPHE))/periodic health evaluation (PHE), and (ii) whether the athlete was insured for medical expenses for (PPHE) /PHE or even in a situation when an injury occurred. In summary, one of the injured athletes had (PPHE)/PHE before participation. Only one athlete (n=1) of the total number of recorded was insured; despite this, the athlete did not have a medical check-up before sports participation.

Acute care

Athletes who sustained contusion (n=1) and abrasion (n=2) injuries where only removed from the field of play. Athletes with lacerations (n=4) were removed from the field of play and managed with ice and bandages from the health service providers. The results revealed strained (n=12) and sprained (n=26) athlete received acute care services. Majority of athletes with strain (n=15) and sprain (n=28) injuries walked off the field without assistance from health service providers respectively. Emergency services were provided mainly by coaches, Physiotherapists and nurses. The services provided included: ice-therapy, bandages, pain killers, stretch exercises and massage. There was no injury that was recorded by health service providers. Majority of the athletes (n=48) were not referred for further medical attention by on-field health service providers.

Intermediate care services

None of the athletes with contusion (n=1) and abrasion (n=2) injury received care services at the intermediate stage. There was only one athlete with a laceration who received nursing care at this stage. The most utilised investigative services to strained athletes were

ultra-sound (n=3) and X-ray (n=3). The athletes with sprains were provided with diagnostic ultra-sound (n=3), physical examination (n=3) and x-ray (n=3). Further, the results show that majority of the athletes received massage (n=19), ice-therapy (n=10) and wound dressing (n=2).

Rehabilitation care services

Athletes who sustained concussion, contusion, abrasion and laceration injuries did not receive any services at this stage of injury management. During the rehabilitation stage, a few athletes with sprains (n=16) and strains (n=3) received physiotherapy care services. Other multidisciplinary members in sports medicine that provided services included the coaches and doctors mainly (Table 3.8).

Return-to-play care services

The majority of athletes cleared themselves to return-to-sports participation. None of the athletes who sustained a contusion, abrasion, a dislocation, laceration or fainted received guidance on how and when to participation to sports. Table 3.9 further demonstrates that a certain section of specialists were involved in giving out clearances to return-to-sports participation. For example, athletes were cleared by coaches (n=4); doctors (n=6); physiotherapists (n=12) and the nursing team (n=1).

In conclusion, results from this study highlight the lack of utilisation of PPHE/PHE, rehabilitation and return-to-play care strategies by both the health service providers and the athletes (Table 3.10). The findings of this study as shown in the Table 3.10, there was non-universal and inconsistent utilisation of acute/immediate, intermediate, rehabilitation, return-to-sports participation care services.

Table 3.10: Components/themes making up best medical practices in sports were utilised to manage sports related injury condition

Injuries	**Preventative care services**	**Acute care services**	**Intermediate care services**	**Rehabilitation care services**	**Return-to-play**
Contusion					
Abrasion					
Laceration					
Fainted					
Concussion					
Strain					
Sprain					
Dislocation					
Fractures					

Note: Red= 0-34% service utilisation; Yellow = 35-50% service utilisation; Green = 55-64% service utilisation**.**

This leads to the next phases of the research which investigates the knowledge of health service providers towards athlete's well-being and best medical care strategies used in sports; facilities (sports, health care and high-performance facilities) and sport health care policies in Uganda. The findings from these studies would provide a better understanding of the barriers to implementing best medical care services to athletes. There are already claims that (personal conservation with some of coaches and injured athletes) a lack of facilities, and federations' officials and the government pay less attention to athletes with sports-related injuries.

3.5 DISCUSSION

The study aimed at examining the medical care services available to the injured athletes in Uganda. The methods used involved observing, documenting and interviewing the consented injured athletes on the treatment modalities received, medical facilities visited and the people who provided the services. This followed through to athletes' return-to-sports participation or to the end of the research period as prescribed by the ethics committees for this research project. One may hypothesize that injured athletes in Uganda do not get the required medical services before, during and after an injury until when the athletes return-to-sports participation.

3.5.1 The injury risk prevention strategy

The results above have shown that only one of the injured athletes (n=75) had undergone PPHE. This finding was supported by a study on the injury prevention strategies of coaches and medical officers in UEFA Elite clubs which showed that the medical screen of athletes was the third favoured injury prevention strategy compared to measures of workloads and subjective markers of the well-being of players (McCall, Dupont & Ekstrand, 2016). This shows that the finding of a low uptake of PPHE is not an issue associated only with developing countries, because the sample from the UEFA Elite club study are from developed European countries. Another example of low uptake of screening in a developed country was an American study of athletes predisposed to asthma (Becker et al, 2004). A small proportion (5%) of the predisposed athletes who died were managed and screened prophylically.

In 2014, McCall et al (2015) also established inconsistency in injury prevention practices among a group of medical doctors working with 2014 FIFA World Cup teams. The authors reported that the majority of the physician accepted to carryout injury prevention practices with their teams. The strategies at their disposal were mainly in the form of exercises, such as warm-ups and stretches as a means of injury prevention.

Another American study showed inconsistencies in the utilisation of sports health guidelines (Buckley, Burdette, & Kelly, 2015). This study showed that 71% of the athletic trainers did not conduct baseline testing for concussion risk injury. The lack of compliance was attributed to time constraints and because the athletic trainers did not rate the necessity of the screening. Physicians mentioned the work-load of the screening tests was too much.

A study investigated the compliance of the German elite coaches with the injury prevention strategies (such as screening of athletes or testing of athletes of the previous injury or for risks of carrying silent condition) (Wilke et al., 2018). The researchers established that only 33% of the Germany clubs using scientific strategies during the screening of injuries in basketball players. The authors further indicated the presence of qualified health service providers in the clubs were associated with better screening practices. Therefore, it can be concluded that the uptake of pre-participation is generally poor, in developed and developing countries. Further research is needed to establish the barriers for this finding.

3.5.2 The emergence care (on-field care) of sports related injuries

The recommended guidelines on emergency care of an injury are to fulfil the five procedures (Guskiewicz & Broglio, 2015). These can be described as; activating the response to injury on the field; on-field assessment of injured athlete; the appropriate remove of an athlete from the field of play/court; and the side-line treatment and evaluation of the athlete; the documentation of the injury, and referral of the injured athlete for further evaluations.

The findings of the current study showed that emergency care services were all inconsistent across the nine injury conditions. For example, nearly half of the athletes did not get treatment on the side-line. Also, the athlete's injuries were not documented at the sports facilities. Besides, typical cases such as concussions, and fractures almost 70% of these injured athletes were not given a referral note for further medical services. This suggests the lack of adequate medical services during the acute phase of sports-related injury for Ugandan athletes.

The literature from Africa that can be used as a source of comparison for these findings is scarce. A study conducted in Malawi, Africa, revealed that none of the health workers for various football clubs had sufficient qualifications for sport first aid practices (Killowe & Mkandawire, 2005). The authors also revealed that the facilities were inadequately equipped to manage acute sports-related injuries.

In summary, the results of this study showed that the emergency care following an injury in Uganda did not meet the expected standards. The reasons for this need to be investigated further.

3.5.3 The hospital care of sports related injuries (Intermediate practices)

The general principles of best practices in sports suggest that an injured athlete referred for further treatment at a recognised medical facility must be re-evaluated by a qualified specialist, and provided with expedited, appropriate and adequate medical services (McCrory et al., 2017; Reneker et al., 2017). The results of the current study showed that the inadequacy in the investigation and treatment services to all the injury conditions (Table 3.6). For example, the concussed athletes (n=2) did not have any further evaluation of their concussion injury. Besides, the treatment (advice to rest, Table 3.6) reported by the athlete at this stage without further monitoring is not in accordance with Concussion in Sport Group Consensus Statement (McCrory et al., 2017). Although MRI, Utra-sound or CT scan modalities have been suggested to be the most efficient investigative modalities for musculoskeletal injury investigations (Aagesen & Melek, 2019; Emprechtinger et al., 2018), not all the athletes with fractures (Table 3.6) were given a chance to have a MRI or CT scan investigation for their injury. Three-quarters of the athletes in this study with sprain or strain injuries did not have the injuries managed with best practice modalities such as electrical therapy, cryotherapy and ultra-sound therapy (Stracciolini et al., 2007). There is no comparable study in sub-Sahara Africa against which these findings can be compared. Further research should be directed towards medical facilities to assess the availability and equipment required the common sports injuries.

3.5.4 The rehabilitation of athlete's injury and return-to-sports participation

Athletes, while undergoing rehabilitation for injuries, feel frustrated and develop anger, depression, and loss of identity (Appaneal et al., 2009). In the principles of best medical practice (rehabilitation), there has been a call to integrate psychological strategies while managing the athlete's rehabilitation process (Crossman, 1997). Return-to-play decision making steps for athletes with muscular injuries consists of three major steps (Bisciotti et al 2018). That require a multidisciplinary team approach (Courson et al., 2014). The findings of this study showed that athletes in Uganda received medical attention from only the physiotherapist, nurses, doctors, and coaches before they returned to sports training. There are no comparable studies in Sub-Sahara Africa. A recent study in New Zealand, investigated on the current practices of sports physiotherapists in implementing psychological strategies during athletes return-to-play rehabilitation to an exploration of their challenges (Annear, Sole, & Devan, 2019). The authors revealed that the barriers to implementing

psychological strategies included the lack of knowledge and training on this specific strategy. Besides, the participants indicated that there was stigma from athletes toward seeking psychological support.

The guidelines for Return-To-Training (RTT) or return-to-play on the majority of injuries is still evolving (McCrory et al., 2017; Bisciotti et al., 2019). The circumstances may differ across different injury types and sports (Guskiewicz & Broglio, 2015). However, the use of a multidisciplinary team to decide on an athlete's return-to-sports participation is regarded as best practice in sports (Courson et al., 2014; Creighton et al., 2010). The findings of this study showed that athletes with muscular, and brain injuries (concussion and fainted) did not make further encounters with any medical professional before they returned to sports participation (Table 3.9). Those injured athletes who mentioned having met the medical care professionals before clearance to sports participation could only recall meeting either a doctor, physiotherapist, coach or gymnasium instructor (Table 3.9).

In the current study, the majority of the athletes cleared themselves to return-to-sports participation (Table 3.9). The findings of this study may suggest a gap in the rehabilitation and return-to-sports knowledge among the sports resource providers, lack of human resources, a policy to support and enforce adequate medical care to injured athletes before they return-to-sports participation. Further, the lack of equipped rehabilitation facilities may cause inadequacy and inappropriate medical services to athletes. Further research should be directed towards the rehabilitation facilities in Uganda and assessing the policies that re-enforce athletes to have adequate and appropriate care before return-to-sports.

3.6 CONCLUSION

This study highlighted the lack of compliance to the best medical care practices while managing athlete's injuries in Uganda. In all the phases of best medical care model (Figure 2.2), there has been inconsistences in the best practice guidelines. Some studies have indicated that the gap in the knowledge of the stake-holders, standard of facilities and the lack of rules and regulations may affect the implementation of best medical practices. The next study follows from this study and investigates the knowledge and practice of the international medical care principle guidelines by the sports resource provides in Uganda.

CHAPTER 4

THE KNOWLEDGE AND PRACTICE OF THE INTERNATIONAL MEDICAL CARE PRINCIPLE GUIDELINES BY THE SPORTS RESOURCE PROVIDERS

4.1 INTRODUCTION

The previous study (Chapter 3) exposed gaps and inconsistences in the use of preventive, immediate, intermediate and rehabilitation best practice guidelines to manage athletes' injury problems. This chapter assesses the three themes that formed the athlete-well-being (Figure 2.2), in conjunction with the International bodies responsible for sports health care policies. These themes include:

i. The components/themes of athletes' well-being,

ii. International sports and health organizations.

iii. Then lastly, assess the level of knowledge and practices about best medical practice principles in sports.

4.2 BACKGROUND

Globally, there have been numerous concerns associated with injuries in sports. These concerns have included the potential for: the poor team or individual performance; early retirement from sports, and disability or even deaths (Davis-Hayes et al., 2018; Gouttebarge, Kerkhoffs, & Lambert, 2016). The high cost of medical care claims due to sports injuries have been reported in New Zealand (NZ), and South Africa's elite youth rugby players (King et al., 2009; King Hume & Trevor, 2010; Brown et al., 2015). These concerns have a significant impact on the athlete's well-being.

Several measures have been implemented by the international bodies, and the various expert groups to improve and support athletes' well-being, including health care. These measures were presented in Chapter Two (section 2.3). The translation of published strategies into practice to improve the athlete's health care is still lacking (Lebrun et al., 2013), the table 4.1 below shows the few research reports on this topic across the world.

Table 4.1: Shows the Knowledge and Practice studies on Injury prevention and management studies

Authors	Objective and methodology	Results	Recommendation
Wilke et al (2018)	Assessing the practices of professional basketball head coaches towards injury prevention. Only coaches (23%) responded to the survey	• 33% of the teams conducts systematic injury screenings. • The methods applied to conduct injury screening and prevent musculoskeletal disorders in German professional basketball teams seemed partially backed by scientific evidence	A need to improve the knowledge
Cunningham (2002)	Establishing the first aid knowledge of youth football officials responsible for dealing with injuries. There was a response rate of 34%.	• Specific injury reporting records were only kept by 19%. • There was significant variations in terms of injury management competency. • There was over half of the respondents (61%) reported that they did not possess a current first aid qualification	• Training courses and perform follow up evaluations after one and two years to determine if knowledge and skills are retained. • There is both a moral and legal responsibility on youth team officials to ensure that a qualified first aider is present at all games and training sessions

Shows the Knowledge and Practice studies on Injury prevention and management studies **(Table 4.1. continued)**

King, Brughelli & Hume (2013)	Used Literature review to update the knowledge of concussion injury management and prevention	• There were 16 to 51% of coaches unable to correctly identify factors related to concussion recognition, management or even prevention techniques. • It was also established that guidelines are available, but the implementation level has not been assessed. • In some cases, guidelines are reported to be conflicting in the management. These affect decisions given to patients on discharge. For example, between 27-32% of discharged instructions to patients were found not to comply with best practices to return-to-sports participation after concussion.	• Updating knowledge resources to create awareness. • There is a need for a regular reviews of the policies and standards available to ensure management and Knowledge of Sport-Related Concussion is current
King, Hume & Trevor (2010)	To assess rugby league team managenrcnt, administrators' and officials' knowledge of first-aid, concussion recognition and manager rent and injury prevention	• The first-aid and concussion knowledge results highlighted a lower understanding of sports-related first-aid and concussion than previously reported	• Injury prevention and care programmes in rugby league at the amateur level in New Zealand should stress first-aid and concussion injury knowledge management to enable knowledge improvement.
Moreau et al (2015)	Assessing the concussion Knowledge and Clinical Practices: A Survey of Doctors of Chiropractic With Sports Certification	• There was a response rate 26%. • The perceived competency was at 95% to manage concussion. • 79% used side-line SCAT3 tool to assess. 96% actively managing concussion	• The evaluation of concussion should be performed by a health care provider with specific training in concussion

This literature has shown that low knowledge of the best practice guidelines contributes to inappropriate or inadequate practices (Bhadana et al., 2015; Engelberg, Moston, & Blank, 2019), and the increased knowledge about sports-related injury management among the sports resource providers improves practices, especially towards injury prevention, and management (Baugh et al., 2014; Crnica et al., 2013; Ching, & Khalili-Borna, 2013). A study in the United States of America revealed that the coaches' knowledge and attitudes towards sports-related injuries impacted positively on the athletes' health and safety (Baugh et al., 2014). There are examples where coaches and managers have been involved in providing first-hand medical care (evaluating, treating and participating in return-to-play decisions) to the athlete. This happens especially in clubs with financial hardships or from countries with a limited number of sports health care professionals such as physiotherapists or sports physicians (Ransone & Dunn-Bennett, 1999). The knowledge and practices of sport resource providers in Uganda are not known. Knowing this is important as it contributes to the management of the health and safety of athletes. In accordance, the first part of the study investigates the level of knowledge of the sports resource providers, including the coaches and managers on the components/themes of the athlete's well-being (Figure 2.2). The second part of the study examined the participants' level of knowledge and practice of the international sports body websites. The third part to this study measured the knowledge of the participants on best medical practices in sports (Figure 2.3).

4.3 DESIGN AND METHODS

This study is a descriptive cross-section survey design. This research method attempts to describe a person's knowledge and practice against a standard measure; in this study the standard measure was best medical care strategies. A quantitative method approach was used to collect the data, using a standardized self-administered questionnaire (Appendix 1).

4.3.1 Study setting

The study was conducted in Uganda in 2015, within the four sporting codes namely: Uganda Athletic Federation (UAF); the Federation of Uganda Basketball Association (FUBA); Federation of Uganda Football Association (FUFA); and the Uganda Rugby Union (URU).

4.3.2 Population and sampling

In 2014, there were 132 clubs registered in the four federations. The number of registered clubs per federation was:

- UAF – 39 clubs
- FUBA – 64 clubs
- FUFA – 15 clubs
- URU – 14 clubs.

Each club was expected to have a manager, a coach, and a medical officer to participate in the study. These positions were collectively defined as *sports resource providers* in this study. The sample size of each sport shown in Table 4.2 contributed to study population of 396 sports resource providers.

Table 4.2: Expected number of participants per the participating federations

Sources of study participants	Clubs	Coachs	Managers	Health service providers	Total of resource providers
Athletics	39	39	39	39	117
Basketball	64	64	64	64	192
Football	15	15	15	15	45
Rugby	14	14	14	14	42
Total	**132**	**132**	**132**	**132**	**396**

Recruitment of participants

The recruitment of the participants for the study occurred on the day of meeting the club executives at their respective club offices. At the club offices, the executive members were requested to provide contact information of their medical, coaching and managing staff of the athletes. The participants were then contacted and invited to participate.

Inclusion criterion

All managers, coaches and health workers working with national athletes in the four federations were eligible for this study. The managers were included because of their role in implementing structures and systems to support the health care activities for medical services providers of teams or clubs.

4.3.3 Research tool

This study utilized a Knowledge (K) and Practice (P) questionnaire, which aimed at measuring variables of knowledge, and practices of best medical care strategies.

Development of the survey tool

The survey tool was developed by the researcher purposely for this study. Below is the detailed explanation of the developmental process.

A. Content of the research tool

The questionnaire was developed using the relevant literature from the questionnaires that had been used in the previous studies, such as BokSmart injury management questionnaire; and Knowledge Attitude and Behavior (KAB) questionnaire for first aid (King, Hume & Clark, 2010). Articles and books having information on the well-being of athletes and health care protocols and programmes in sports were also consulted (Mazanov, Backhouse, Connor, Hemphill & Quirk, 2013, IOC medical commission, 2013; FIFA-Player's health, 2013; IRB-Player's welfare, 2013; IAAF-Medical manual, 2013) . Other possible variables in the K and P research tool were identified from the items that made up the conceptual framework model for the well-being of athletes and best medical care practice. This model was explained in the previous study (Chapter 3).

B. The structure and layout of the research tool

The structure of the questionnaire comprised three parts. Part one consisted of Socio-demographic items. Part two consisted of the items seeking the understanding of the respondents about the well-being of athletes, and best medical care practices. Part three, questioned the respondents;' usual actions to support the well-being and health care of athletes. The detailed content of each section is presented below (Table 4.3).

Socio-demographic section

This section had seven demographic items on: age, gender, level of education, history or current sports participation, role in sports sector in Uganda, and employment terms (full/part time).

Knowledge section

The section had 13 knowledge items. The items sought the level of agreement or understanding on the various variables under the following themes: Managing athlete's well-

being; goals and objectives of international sporting bodies; pre-participation Health Examination (PPHE) and Periodic Health Evaluation (PHE); first aid treatment (unconscious athlete, musculoskeletal problem, concussed athlete, athlete with a fractured bone and use of bandages and dressings); specialist care for (concussed or fractured athlete); definitions of sports injuries; type of treatment available for injured athlete; management of concussed player full recovery; and rehabilitation specialists.

Practice section

There were 16 items on the item of practice. These items inquired about the actions taken by the resource providers to support the well-being and health care of athletes in Uganda. Specifically, the actions are arranged from 1-16 (Appendix 1).

1. The respondents' usual action on the well-being of athletes
2. The respondent's usual source of information about well-being of athletes, from the four sports bodies mentioned, including the World Health Organisation (WHO).
3. The respondent's use of Pre-Participation Health Examination (PPHE) and Periodic Health Evaluation (PHE) in managing athlete's health.
4. The respondent's ability to provide first aid treatment.
5. The respondent's ability to manage acute musculoskeletal injuries.
6. The respondent's usual protocols to address acute soft tissue injury problems.
7. Whether the respondents usually refer athletes with ill health for further management.
8. The respondent's usual referral specialist for fractured athletes.
9. The respondent's usual referral specialists for cardiac patients.
10. Whether the respondents did the injury surveillance programmes.
11. The respondent's usual tools used for the injury surveillance activities.
12. Whether the respondentsprovide treatment to athletes.
13. The common type of treatment administered to athletes with various medical conditions.
14. Whether the respondents manage concussed players
15. Whether the respondents usually participate in the rehabilitation process and
16. Usual rehabilitation services given.

C. Questionnaire items and answer format

In some of the items, the respondents were provided with a pre-specified set of answers, such as *yes* or *no*. In other items, they had several responses ranging from 2 to 12 for each item. The respondents had to select one of the answers from pre-specified set of answers presented in Likert's scale to respond to each variable.

To assess the participant's knowledge on a given item and variable, the possible answers could be- *very good*, or *strongly agree* (score 5 points), *good or agree* (4 points), *barely acceptable* or *undecided* (3 points), *poor or disagree* (2 points), *very poor* or *strongly disagree* (1 point).

For the behavior or practice section, there were eight (8) items where the respondents had to tick either a *yes* or *no*. For the remainder of the items in this section, the respondents had to tick between *very frequent* (6 score points), *frequent* (5 score points), *occasionally* (4), *rarely* (3), *very rarely* (2) and *never* (1) for each variable.

Note: While developing the survey items, I was mindful of not making the questionnaire too long at the risk of inconveniencing the participants. The questionnaire took between 30 to 50 minutes to complete.

Table 4.3: A summary of questionnaire items

Item no.	Demographics section
	PART I
1	Age
2	Gender
3	Level of education
4	History or current level of participation in sports
5	Level of participation in sport
6	Responsibility of the participants in sports sector
7	Employment terms
	PART II
	Knowledge about
1	Competency on well-being of athletes
2	Goals and objectives of International sporting bodies, including WADA, and WHO
3	Preventive care (PPE/PHE)

A summary of questionnaire items (**Continuation of: Table 4.3**)

4	Acute care of unconscious athlete on field
5	Acute care of muscle injury on field
6	Acute care of concussed athlete on field
7	Acute care of fractured athlete on the field
8	Use of dressing and bandages
9	Specialists for managing concussion
10	Specialist for managing a fractured athlete
11	Definitions of injuries
12	Type of treatments available to sick athletes
13	Specialist available for rehabilitation of athletes with varying conditions
	Behavior or Practices
1	Actions regarding well-being of athletes
2	Source of information on well-being of athletes
3	Use of preventive care (PPE/PHE)
4	First aid treatment for various injuries
5	Managing acute Soft Tissue Injuries (STI)
6	Usual protocols for managing STI
7	Use of referral systems
8	Specialists referred for fracture injury
9	Specialists referred for cardiac cases
10	Use of injury surveillance systems
11	Tools commonly used
12	Types of treatment given to the various injuries
13	Management of concussed player to full recovery
14	Usual participation in the rehabilitation process
15	Actions during the rehabilitation process

D. The validity, reliability and piloting of the research tool

An expert group validated the questions. Reliability of the questionnaire items was assessed through specialist reviews and a pilot study. A scientific group based at Sports Science Institute of South Africa reviewed the content of the questionnaire for sports injury prevention. The necessary revision and adjustments were made to the questionnaire after considering their recommendations. Comments were further sought from three experienced sports resource providers: a physiotherapist, a coach, and a sports manager. Their suggestions and comments were considered by the researcher, and the questionnaire was edited accordingly.

Before the main study, the questionnaire was assessed in a pilot study. The purpose of the pilot study was to identify any challenges or difficulties in administering the questionnaire. Before the questionnaire was used with the target group, it was piloted in a neighbouring country (Kenya). It was tested on five Kenyan national coaches, eight health services providers and two managers. English is the official language spoken by coaches, managers and health service providers, therefore, there was no need to translate the questionnaire into another language.

4.3.4 Procedure of data collection

On the day of the appointment, a brief introduction of the research team and the background to the project was presented to the participants. In addition, the purpose of the study and the ethical issues involved in the study were presented to the participants. They were asked to sign a consent form after the study has been explained.

After each participant had signed the consent form, a pen-and-paper version of the questionnaire was distributed to the manager, coach, and health workers. This was the same processes and procedure for all the clubs and camps that were selected for this research study. The time chosen to meet the participants was either during training, after a match or competitions. Options to complete the questionnaire at later hours or days were made available for some participants who requested to do so. The participants were given the information sheet, consent forms, and self-reported questionnaire, and were asked to complete the questionnaire, without any further instruction. In this study, we assumed that participants gave the most honest and accurate responses.

Data storage

The questionnaires were stored in the research office, located at a different site from the research centres. In addition, the principle researcher kept the key to the office.

Data analysis

The data were extracted from the questionnaire into the excel spreadsheet. In the excel spread-sheet, the responses to the variables were coded. For example: *Yes* response was coded as 2; *No* response as 1; *blank* or *missed* response as 0. Other responses were coded as follows: *strongly agree* was five; *agree* four; *undecided* three; *disagree* two; *strongly disagree* one and *blank space* zero. In case of practice responses: *Very frequent* was coded six; *frequent* five; *occasionally* four; *rarely* three; *very rarely* two*; never*, one and where a

participant left a blank space zero. The data were then transferred to Stata version 14 (StataCorp LLC, 4905 Lakeway Drive College Station, Texas 77845-4512, USA) for analysis. Descriptive statistics were used to summarize the demographic variables. All responses to the items were analysed using frequencies and percentages. When generating the frequency tables and graphs from the Stata programme, all variables that had no responses in the questionnaire were further excluded from data in the analysis. The total number of responses was used as the denominator in the calculation of percentage. In addition, the items from each question that had four or six responses were collapsed to two responses (Yahui & Swaminathan, 2017). For example, *agree* and *strongly agree* in the knowledge section was categorized as being *in agreement or standard knowledge*. The responses such as: *undecided*, *disagree* and *strongly disagree* answers were categorized as *no agreement*. The same applied to the practice section. *Frequent* and *very frequent* practice responses qualified to be categorized as *usual practices*. *Never, very rarely, rarely* and *occasionally* were categorized as *unusual practices* in the Figures and tables. Where it is applicable; a comparison was made between the knowledge and practice responses.

4.3.5 Ethics consideration throughout the study

The study was cleared by the Human Research Ethics Committee of the Faculty of Health Science, University of Cape Town (HREC 584/2014).

4.4 RESULTS

4.4.1 Data analysis

The data are presented in three sections; A, B and C (Figure 4.2 below). The socio-demographic characteristics of the participants are presented in section A. Section B and C have the results of the participants' (sports resource providers) responses to knowledge and practice questions regarding international sporting bodies and athlete's well-being; best medical care practice respectively (Figure 4.1 below).

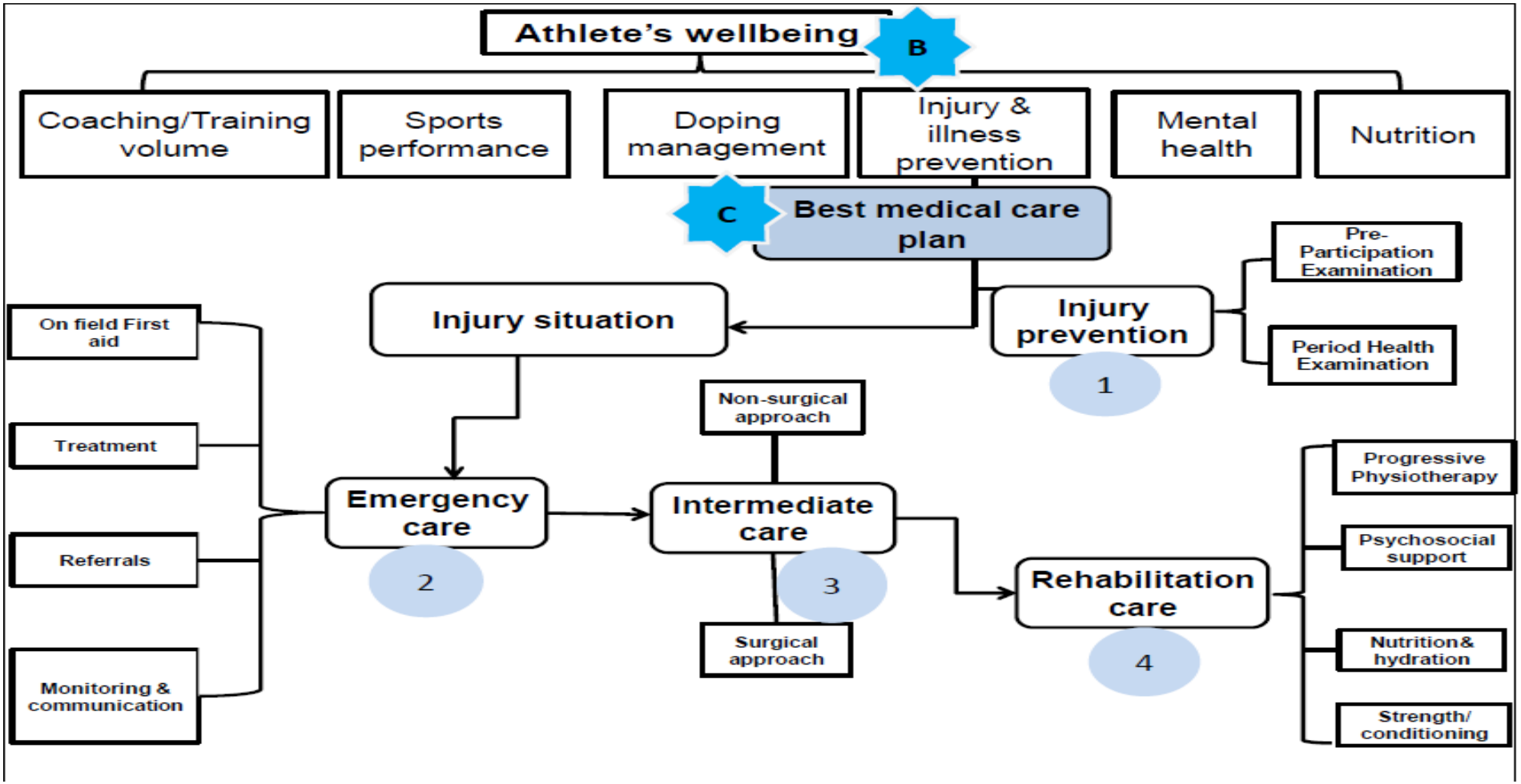


Figure 4.1: Conceptual model for the well-being and best medical care of an athlete

Point A, shows all the components/themes of well-being of an athlete. Point B, shows the components/themes of the best medical care plan. The medical care plan is further divided into units (1-4). Each unit has sub-units, which demonstrate the kind of service expected at that specific stage.

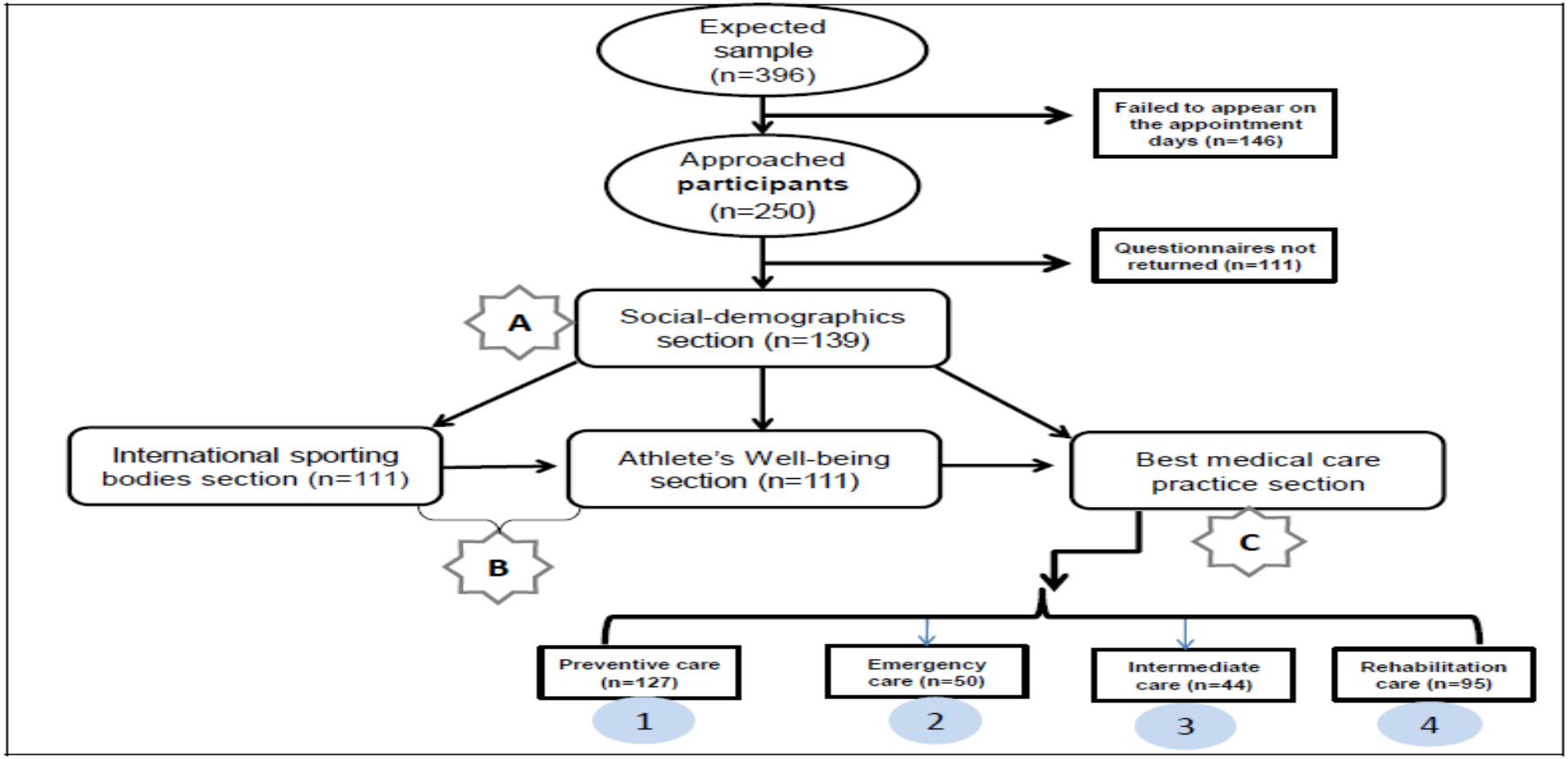


Figure 4.2: A flow diagram illustrating the number of respondents per section

A summary of sections and specific strategies (1-4) contained in the result chapter of this study. The variation in the sample size throughout the sections is because of the removal of the missing data.

4.4.2 Section A

Social-demographic characteristics of the participants

As shown in Figure 4.2 above, a total of 139 sports resource providers participated in the study, equivalent to a 35% response rate. The social-demographic profile of the questionnaire focused on: sex, age, sports code for participants, years of participation and level of participation, job responsibilities and employment terms (Table 4.5). In addition, the highest level of education of the participants was also requested. Table 4.4 also provides a summary of participants from each sporting code.

Table 4.4: Actual number of participants per sports code and their roles

Sources of study participants	Total participants	Coachs	Managers	Health service providers
Athletics	39 (28%)	24	13	4
Basketball	34 (24%)	17	12	6
Football	6 (4%)	2	1	2
Rugby	37 (27%)	16	9	13
Multiple	19 (14%)	6	8	-
None of the codes	4 (3%)	2	-	-
Total	**139**	**67**	**43**	**25**

Only 15 sports resource providers (11% of the total number of participants who returned the questionnaires) answered the question about the level of education. The highest number of respondents indicated had attended rugby coaching courses 8 (6%) and athletics coaching training respectively 4 (3%) (Table 4.5).

Table 4.5: Social-demographics information of the participants

Units	Characteristics		Number	Percentage
1	Sex (n=139)			
		Male	115	83%
		Female	24	17%
2	Age (years) (n=108)	**Mean (27±16)**		
		20 -29	29	27%
		30 – 39	56	51%
		40 – 49	15	14%
		50 – 60	8	7%
3	Current/past sports participation (n=134)			
		Athletics	40	30%
		Rugby	37	27%
		Basketball	33	24%
		Multiple	13	9%
		Athletics + football	5	4%
		Football	1	1%
		Athletics + basketball	1	1%
		Netball	1	1%
		Baseball	1	1%
		Swimming	1	1%
		Volleyball	1	1%
3	Sporting experience in years (n=110)			
		0 –9	42	38%
		10 –19	45	41%
		20 -- 29	15	14%
		30 - -39	7	6%
		40 -- 49	1	1%
4	Level of participation (n=129)			
		Professional	9	7%
		Elite	56	43%
		Amateur	54	42%
		Recreational	10	8%
5	Current role in sports activities (n=136)			
		Coaches	68	49%
		Managers	44	32%
		Medics	25	18%
		Manager/coach	1	1%
6	Employment terms (n=137)			
		Full time	58	42%
		Part time	79	58%

4.4.3 Section B

This section reports on the participants' level of knowledge and practice on managing athlete's well-being and international sporting bodies.

A. Managing athletes' well-being

The participants were asked if their job responsibilities contributed to the athletes' well-being; in response to this question, 128 (93%) of the respondents indicated their job contributed to the athlete's well-being.

Participants were further asked to rate their own level of competence to assist athletes in managing the various aspects of their well-being (Figure 2.2). Only eight-nine (71%) of the respondents indicated they able to assist athletes with managing doping (Table 4.6). Participants had more perceived competence in other aspects such as; coaching 125 (98%), sports performance 122 (96%) and mental health challenges 121 (95 %) respectively (Table 4.6).

Table 4.6: Perceived competence in assisting athletes to manage various aspects of well-being

No.	Perceived competence	Below standard (xx)	Standard (x)	Total responses
1	Coaching/training volume	3 (2%)	125 (98%)	128
2	Sports performance	5 (4%)	122 (96%)	127
3	Doping management	37 (29%)	89 (71%)	126
4	Injury & illness prevention	5 (4%)	122 (96%)	127
5	Mental health	6 (5%)	121 (95%)	127
6	Nutrition	7 (6%)	119 (94%)	126

x: agree and strongly agree; xx: undecided, disagree and strongly disagree

B. International sporting bodies

The participants were asked "*do you know the goals and objectives of the organizations such as: WHO, IOC, FIFA, IAAF, FINA, WADA and FIBA*" (details are in the questionnaire Appendix 11). Out of 138 (100%) respondents, 123 (89%) knew and were aware of the goals and objectives of the international sporting bodies above.

The next question asked, was whether they used organizations such as: "WHO, IOC, FIFA, IAAF, FINA, WADA and FIBA" to source of information about the athlete's well-being

(Table 4.7). The most consulted organization in this case was IAAF 39 (34%) and IOC 30 (27%), and the least consulted organization was FINA 7 (7%).

Table 4.7: Respondent's sources of information concerning the well-being

Item No.	Organization	Unusual (xx)	Usually (x)	Total responses
1	IAAF	77 (64%)	39 (34%)	116
2	IOC	81 (73%)	30 (27%)	111
3	FIBA	82 (77%)	24 (23%)	106
4	WHO	91 (81%)	21 (19%)	112
5	FIFA	96 (84%)	19 (16%)	115
6	WADA	90 (90%)	10 (10%)	100
7	FINA	93 (93%)	7 (7%)	100

x Answered; frequent and very frequent. xx answered; never, rarely and occasionally.

4.4.4 Section C

This section reports on the level of knowledge and behavior of the participants on the best medical care plan in sports in Uganda (Details in Figure 4.1; part C with sequences from 1-4). Where possible the knowledge and practice are matched for comparison within each strategy item.

A. Sports injury prevention strategies (Figure 4.1-part C, sequence 1)

This section aimed at establishing whether the sports resource providers knew and practiced some of the facets of the injury prevention methods such as: Pre-participation Examination (PPHE) and Periodic Health Evaluation (PHE). The participants were asked "*how do you rate your standard knowledge on PHE as part of the athletes/players health care programme and PPE as part of the health care programme for athletes*?" The results (Table 4.8) indicate that the knowledge about PPHE as a health care programme for athletes was higher than PHE.

Table 4.8: Participant's knowledge about PPHE/PHE

Item No	Question	Below standard (xx)	Standard (x)	Total response
3a	PHE as part of the athletes'/players healthcare	74 (57%)	55 (43%)	129
3b	PPHE is part of healthcare programme for athletes and players.	15 (12%)	114 (88%)	129

x: agree and strongly agree; xx: undecided, disagree and strongly disagree

Further, participants were required to indicate if PPHE and PHE strategies were used in the daily practice to reduce the risk of injuries. Table 4.9 below shows the results of the participant's usual behaviour. Of the 128 participants who responded to item 26 (20%)

indicated using PHE to monitor athlete's well-being, whereas 29 (23%) of the respondent to the item 2 in the table indicated that they use PHE to educate athletes about health risk behaviours.

The results of usual practice (PHE) in the Table 4.9 below were compared with the knowledge (PHE) in the Table 4.8. Any data point to the right of the line of unity (- - - - - -) suggests that the knowledge for that treatment exceeds the implementation of the practice. The ideal scenario would be to have a knowledge score of close to 100% with a very high corresponding practice (or implementation) score. However, for the purpose of the interpretation of these scores, a score of 60% for knowledge and practice is defined as being "*acceptable"*. Therefore, Figure 4.3 below shows, knowledge regarding PHE and PPHE was higher compared to implementation (practice), but below the *acceptable* level of 60%.

Table 4.9: Uses of PPHE and PHE

Item No.	Prevention	Un usual (x)	Usually (xx)	Total responses
1	PHE monitor athlete's well-being	102 (80%)	26 (20%)	128
2	PHE educate health risk behaviors	97 (77%)	29 (23%)	126

x Frequent and very frequent: xx never, rarely and occasionally

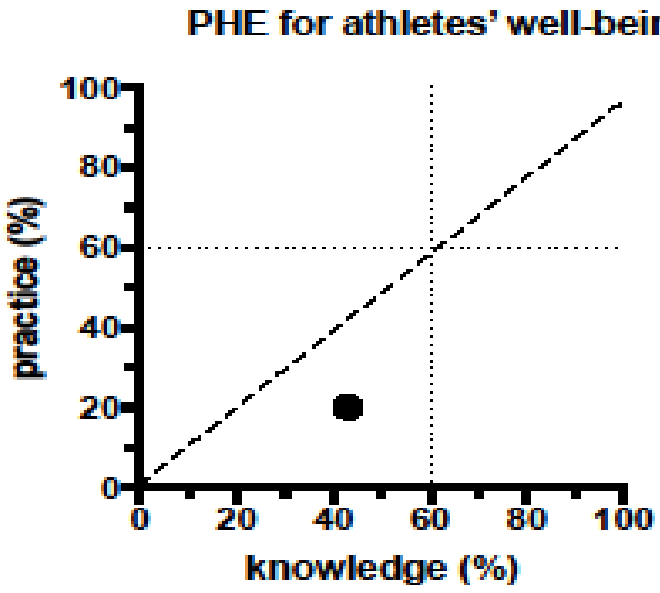


Figure 4.3: The relationship between knowledge and practice scores for two methods associated with athlete's evaluation before sports participation

(Periodic health evaluation and pre-participation examination).

B. Emergency care (Figure 4.1-part C, sequence 2)

This part of the study aimed at establishing if the sports resource providers knew and practiced first aid treatment. The questions also included other components/themes of emergency medical care such as referral, and monitoring and communication (Figure 2.3, number 2) for any injury sustained by an athlete.

i. On-field first aid

The first question (A) asked participants "*In practice, as a sports resource provider, are you required to administer first aid treatment following an athlete's injury or illness*?" Seventy-five (54%) of the respondents answered *yes* (accepted): i.e they assisted athletes when required to provide first aid treatment.

ii. On-field treatment

The second question (B), asked participants *"If a player collapses, and is unconscious with a suspected foreign body airway obstruction, (choking). In your opinion, it is right to* ***firstly (questions Table 4.10)****".* Table 4.9 shows the results of the participants' standard knowledge on the appropriate care during the acute stage for an athlete who is unconscious and choked. Twenty-two (32%) participants did not agree with the correct statement about *calling ambulance while simultaneously giving 1-5 back blows*

Table 4.10: Response to the question: A player collapses, and is unconscious with a suspected foreign body obstruction, (choking).

Your first action would be to;

No	First aid treatment	No agreement (xx)	Agree (x)	Total response
1	I call the ambulance while simultaneously giving 1-5 back blows	22 (32%)	47 (68%)	69
2	I call the ambulance first and then do CPR	35 (53%)	31 (47%)	66
3	I call the ambulance while encouraging a player/athlete to cough	42 (65%)	23 (35%)	65

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

The third question (c), asked participants *"which of the following first aid protocol would be appropriate for a concussed player sitting on the pitch or field*?" The results (Table 4.11

below) shows that 33 (73%) agreed that "*Danger, Response, Airway, Breathing and Circulation (DRABC)*" was the appropriate protocol for the treatment of a concussed athlete followed by *Airway, Breathing, Circulation, Disability and Exposure (ABCDE)* 29 (69%), and *Stop, Ask, Look, Touch, Active movement and Passive movement and Stand-up (SALTAP) 29 (64%) compared to Rice, Ice, Compress and Elevation (RICE) 11 (33%)* protocols. In this case, however, ABCDE would have been the first choice. This is because 90% of the concussed players or athletes do not necessary become unconscious but are supposed to be in a quiet place.

Table 4.11: Preferred first aid for a concussed athlete

No	Protocol	No agreement (xx)	Agreement (x)	Total respondents
1	DR ABC	12 (27%)	33 (73%)	45
2	ABCDE	13 (31%)	29 (69%)	42
3	SALTAPS	15 (36%)	27 (64%)	42
4	RICE	28 (72%)	11 (38%)	39

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

In the fourth question (D), participants were asked *"which of the following protocol would be appropriate for bruised muscle (minor injury) of an athlete or player?*" The results (Table 4.12 below) shows 39 (85%) agreed that *RICE* was the appropriate protocol for the treatment of a bruised muscle followed by *SALTAPS* 30 (75%), compared *DRABC* 16 (38%) and *ABCDE* 13 (33%) protocols

Table 4.12: Preferred first aid for bruised muscle

No.	Protocol	No agreement (xx)	Agree (x)	Total respondents
1	DR ABC	26 (62%)	16 (38%)	42
2	ABCDE	27 (68%)	13 (32%)	40
3	SALTAPS	10 (25%)	30 (75%)	40
4	RICE	7 (25%)	39 (85%)	46

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

In the fifth question (E), participants were asked *"which of the following protocol would be appropriate for ruptured muscle (major injury) of an athlete or player?*" The results (Table 4.13) shows 32 (78% indicated that *RICE* was the appropriate protocol for the treatment of a ruptured muscle followed by *SALTAPS* 32 (73%), compared to *DRABC* 18

(45%) and *ABCDE* 16 (40%) protocols respectively. In this case, rupturing a muscle fiber is a major injury, therefore an athlete would benefit from SALTAPS protocol.

Table 4.13: Preferred first aid for a ruptured muscle

No	Protocol	No agreement (xx)	Agreement (x)	Total respondents
1	DR ABC	22 (55%)	18 (45%)	40
2	ABCDE	24 (60%)	16 (40%)	40
3	SALTAPS	12 (27%)	32 (73%)	44
4	RICE	9 (22%)	32 (78%)	41

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

In the sixth question (F), participants were asked *"which of the following protocol would be appropriate for fracture leg of an athlete (major injury) or player?*" The results (Table 4.14) shows 37 (86%) agreed that *SALTAPS* was the appropriate protocol for the treatment of a fractured athlete followed by *RICE* 27 (67%), compared to *ABCDE* (56%) and *DR-ABC* (46%) protocols respectively. In this case, majority of the participants were right, however, the percentage of the respondents with wrong answers was significant as demonstrated in the table 4.14 below.

Table 4.14: Preferred first aid for a fracture

No	Protocol	No agreement (xx)	Agreement (x)	Total respondents
1	SALTAPTS	6 (14%)	37 (86%)	43
1	RICE	13 (33%)	27 (67%)	40
2	ABCDE	18 (44%)	23 (56%)	41
4	DRABC	21 (54%)	18 (46%)	39

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

The seventh question (G) regarding emergency care management asked the participants *"which of the following is the best use for bandages and dressings following an athlete's open wound injury?*" The results (Table 4.15) shows 43 (93%) agreed that it is to prevent infection, and 42 (91%) agreed that it is to help control bleeding, compared to pain reduction 27 (64%), athlete's removal from the field of play 26 (62%) and reduction in the internal bleeding of tissues 20 (47%) respectively. In this case, the best use of dressings and bandages is to control bleeding of an athlete's bruise/wound. Therefore, the majority of the participants were not sure of the correct answer.

Table 4.15: The best use for bandages and dressings following an athlete's open wound injury

No.	Dressing and bandages	Disagrees (xx)	Agree (x)	Total respondants
1	Reducing pain	13	27	40
2	Reducing internal bleeding	23	20	43
3	Help control bleeding	4	32	26
4	Prevention of infection	3	41	43
5	Make it easier to remove the player or athlete after injury	16	26	42

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

In the last question (H) under emergency care management; the participants were further asked "*In your position, how often do you use the following protocols as primary care of a calf muscle strain of player or athlete on the sports court or field?"* Table 4.16 shows that *RICE* 46 (67%) was the most common protocol used to manage acute muscle strain/rupture, followed by *SALTAP* 28 (44%).

Table 4.16: Protocols used to manage acute calf muscle strain/rupture on the field or court

No	Protocol	Un usual (xx)	Usually (x)	Total respondents
1	RICE	23 (33%)	46 (67%)	69
2	SALTAPS	36 (56%)	28 (44%)	64
3	ABCDE	45 (75%)	15 (25%)	60
4	DR ABC	47 (77%)	14 (23%)	61

x Answered; frequent and very frequent. xx never, rarely and occasionally.

A comparison was made between knowledge of the various protocols (Table 4.14) and practice in using them (Table 4.16) in managing acute muscle injury of an athlete.

Any data point to the right of the line of unity (- - - - - -) suggests that the knowledge for that treatment exceeds the implementation of the practice. As before a score of 60% for knowledge and practice is defined as being "*acceptable.* Therefore, Figure 4.4 below shows, knowledge regarding RICE and SALTAP was higher compared to implementation (practice), at the same time within the acceptable region. Despite the high level of knowledge of ABCDE and DRABC compared to implementation (practice), it however fell below the *acceptable* level of 60%.

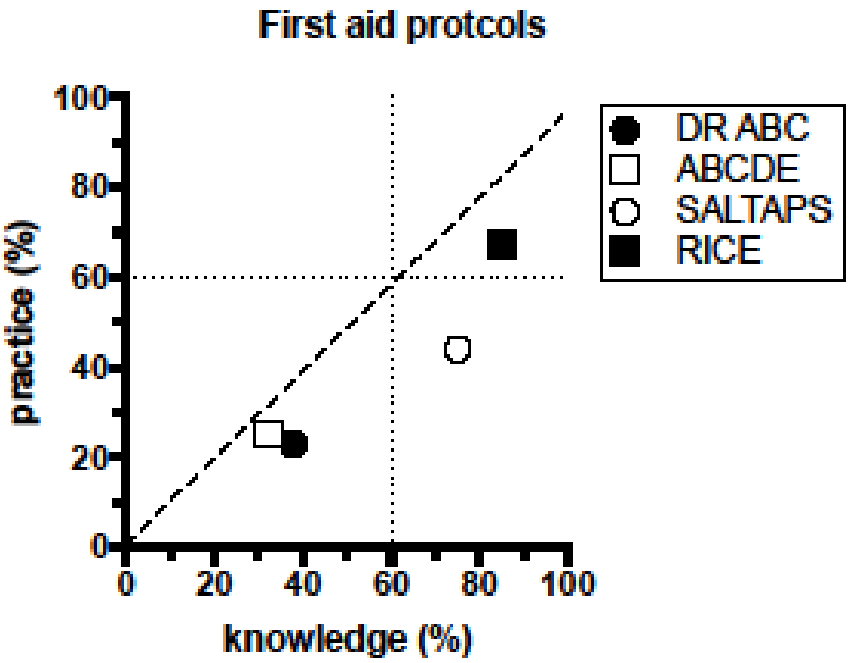


Figure 4.4: The relationship between knowledge and practice scores for the protocols associated with athlete's treatment following an injury after sports participation

(Danger, Response, Airway, Breathing and Circulation (DRABC); Airway, Breathing, Circulation, Disability and Exposure (ABCDE); Stop, Ask, Look, Touch, Active movement and Passive movement and Stand-up (SALTAP); Rest, Ice, Compress and Elevation (RICE). The correct knowledge and correct implementation of these treatments are displayed.

iii. Communication and monitoring of athletes' injury

The aim of the next section of the study was to establish the knowledge and practice of the participants towards monitoring and communicating of athletes' injury conditions.

The first question, participants were asked "*In your usual practice, are you required to record and report sports injury circumstances when they occur or when athletes report such incidence*?" 65(49%) of the respondents indicated that they are required to record or monitor athletes' injury status, whereas 68 (51%) indicated that they are not required to record and report injury cases.

B The respondents who answered YES to this question were then asked, "*In your opinion, which of the following statements below is correct*?"

Fifty (77%) of the participants responded with the correct answer (Table 4.17 below), by agreeing that a recurrent injury was an injury of the same type and at the same site as an

index injury and which occurs after a player's return to full participation from the index injury, 30 (51%) of respondents gave a wrong answer by stating that a re-current injury was an injury of the same type which occurs after a player's return to full participation from the previous injury.

Table 4.17: Sports injury definitions: investigating the knowledge of injury monitoring strategy

No.	Statements	No agreement (x)	Agreement (xx)	Total respondents
1	A recurrent injury is an injury of the same type and at the same site as an index injury and which occurs after a player's return to full participation from the index injury	15 (23%)	50 (77%)	**65**
2	A recurrent injury is an injury of the same type which occurs after a player's return to full participation from the previous injury	29 (49%)	30 (51%)	**59**
3	The severity of an injury is the number of days that have elapsed from the date of injury to the date of the player's return to full participation in team training and availability for match selection	14 (23%)	47 (77%)	**61**

x: undecided, disagree and strongly disagree; xx: agree and strongly agree

For the question concerning the injury severity (item 3), 47 (77%) of the participants gave a correct answer by agreeing that it is *the number of days that have elapsed from the date of injury to the date of the player's return to full participation in team training and availability for match selection.*

The third question (C) asked participants "*Which of the following tools do you use often for monitoring and reporting of sports injury circumstances*?"

The most used forms to record the athletes' injury status were (Table 4.18): F-MARC (16%), followed by SCAT 8 (15%) and IOC form 8 (14%) respectively

Table 4.18: Sports Injury recording forms: investigating injury monitoring knowledge

Item No.	Record of injury	Un usual (x)	Usual (xx)	Total respondents
1	F-MARC FORM	48 (84%)	9 (16%)	57
2	SCAT TOOL	47 (86%)	8 (14%)	55
3	IOC-FORM	50 (86%)	8 (14%)	58
3	DALDA	53 (91%)	5 (9%)	58
4	GPS	55 (98%)	1 (2%)	56

xx answered; frequent and very frequent; x answered; never, rarely and occasionally.

iv. Referral of injuries

Referral is the last component during the emergency care of an injury (Figure 4.1 part 2). The first question asked participants *"In your position, do you ever refer players or athletes to health service providers*?" Most of the (129) respondents (87%) indicated they referred injured athletes to specialists.

The second question, probed into participants' practice following a bone fracture. They were asked, "*How often do you refer a player or athlete after fracture during training or match time to see the following*? Table 4.19 indicates that most of the participants refer fractured athletes to a radiologist 42 (37%) and a physiotherapist 40 (35%).

Table 4.19: Often refer a fractured athlete to which specialists.

Item No.	Specialists	Un usual practice(x)	Usual practice (xx)	Total respondents
1	Radiologist	71 (63%)	42 (37%)	113
2	Physiotherapy	78 (65%)	40 (35%)	115
3	G.P	73 (66%)	37 (34%)	110
4	Sports physician	79 (69%)	36 (31%)	115
5	Orthopedics	81 (72%)	31 (28%)	112
6	Healer	99 (90%)	11 (10%)	110

x meant frequent and very frequent; xx meant never, rarely and occasionally.

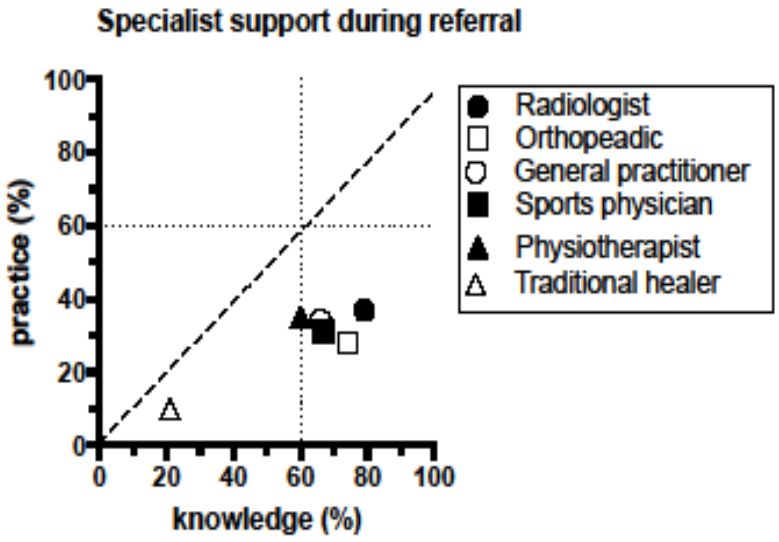
The third question, was designed to establish the participants' knowledge about referrals. They were asked, "*Who do you think a player or athlete, who has sustained the Fracture injury during participation in sports event, should consult for a diagnosis*? Table 4.20 shows 88 (79%) of the respondents indicated that the best referral for fractured athlete is the radiologist, followed by orthopedic surgeon 83 (74%).

Table 4.20: Referral specialists for the fractured athlete

No.	Specialists	No agreement(x)	Agreement (xx)	Total response
1	Radiologist	23 (21%)	88 (79%)	111
2	Orthopedic	29 (26%)	83 (74%)	112
3	G. Practitioners	37 (34%)	73 (66%)	110
4	Sports physician	34 (33%)	69 (67%)	103
5	Physiotherapist	44 (40%)	65 (60%)	109
6	Traditional healer	83 (79%)	22 (21%)	105

x: undecided, disagree and strongly disagree; xx: agree and strongly agree

The knowledge and implementation (practice) of referral for a fractured athlete were further compared. Data is obtained from Table 4.19 and Table 4.20. Figure 4.5 below shows, knowledge regarding the referral of an athlete was greater than implementation (practice). Figure 4.5 continue to indicate the referral knowledge fell above the 60% for most of the participants, which is the *acceptable* level.



n=138

Figure 4.5: The relationship between knowledge and practice scores for the specialist referrals of an athlete following an injury after sports participation

(Radiologist, Orthopedics, General practitioner, Sports physician, Physiotherapist and Traditional healers). The correct knowledge and correct implementation of these treatments are displayed.

C. Intermediate care (Figure 2.2 part 3)

The next phase of the study aimed at establishing the common practices and knowledge of the sports resource providers during the intermediate stage of an athlete's injury. The context of this aspect of the study is referred to in Figure 2.2 part 3.

The first question the participants were asked, "*Do you provide treatment to athletes' or players' injuries after their participation in sports activities?"* Fifty-five (55; 50%) of the respondents (sports resource service providers) usually provide treatment to injured athletes and the other 55 (50%) do not provide treatment.

To establish knowledge regarding the management of sports-related concussion injury during intermediate stage, the respondents were asked to "*Indicate the level of agreement with the following statements (*Table 4.21*).*

" The results indicate that 30 (73%) of the participants agreed that the return-to-play protocol would "*depend on the time symptoms are resolved".* The next popular choice was that, "*Concussed player or athlete assessed on the pitch/side-line assessment, referred to hospital or medical centre, then start Return –to-play protocol* 27 (64%)".

Table 4.21: Management of concussion

No.	Care protocol	No Agreement (x)	Agree (xx)	Total respondents
1	The return-to-play protocol will depend on the time symptoms are resolved	11 (27%)	30 (73%)	41
2	Concussed player or athlete assessed on the pitch/side-line assessment, referred to hospital or medical centre, then start Return –to-play protocol.	15 (36%)	27 (64%)	42
2	During treatment assist a player in activities that require concentration and attention until symptoms are absent for a minimum of 24hrs consecutively without medication	17 (43%)	23 (58%)	40
4	For suspected concussed player or athlete-on pitch/side-line assessment, then start the return-to-play protocol	29 (71%)	12 (29%)	41

x: undecided, disagree and strongly disagree; xx: agree and strongly agree.

The third question, the participants were asked; "*In your opinion, would you treat the following cases using surgical means?"* Table 4.22 shows that 72% (n=34) of the participants agreed that ACL was a surgical condition. Fifty-nine % (n=29) respondents indicated that a fracture needs treatment with surgery.

Table 4.22: The following injuries require surgical care

No.	Injuries/conditions	No Agreement (x)	Agreement (xx)	Total respondents
1	ACL injury	13 (28%)	34 (72%)	47
2	Fracture	20 (41%)	29 (59%)	49
3	Muscle contusion	33 (66%)	17 (34%)	50
4	Shin pain	38 (76%)	12 (24%)	50
5	Ankle sprain	38 (76%)	12 (24%)	50
6	Concussion	42 (82%)	9 (18%)	51

x: undecided, disagree and strongly disagree; xx: agree and strongly agree

The fourth question the participants were asked: "*In your opinion, would you treat the following cases using non-surgical means?"* Table 4.22 shows that 74% of the participants (n=34) indicated that shin pain should be treated using non-surgical means. The responses to concussion, muscle contusion, fracture and ACL injury are shown in Table 4.23.

Table 4.23: The treatment approaches for the various sports injuries

No.		Non-surgical approach	No Agreement	Agreement	Total respondents
1		Shin pain	12 (26%)	34 (74%)	46
2		Ankle sprain	15 (31%)	34 (69%)	49
3		Concussion	22 (49%)	23 (51%)	45
4		Muscle contusion	21 (58%)	15 (42%)	36
5		Fracture	29 (69%)	13 (31%)	42
6		ACL injury	28 (68%)	13 (32%)	41

xx: undecided, disagree and strongly disagree; x: agree and strongly agree

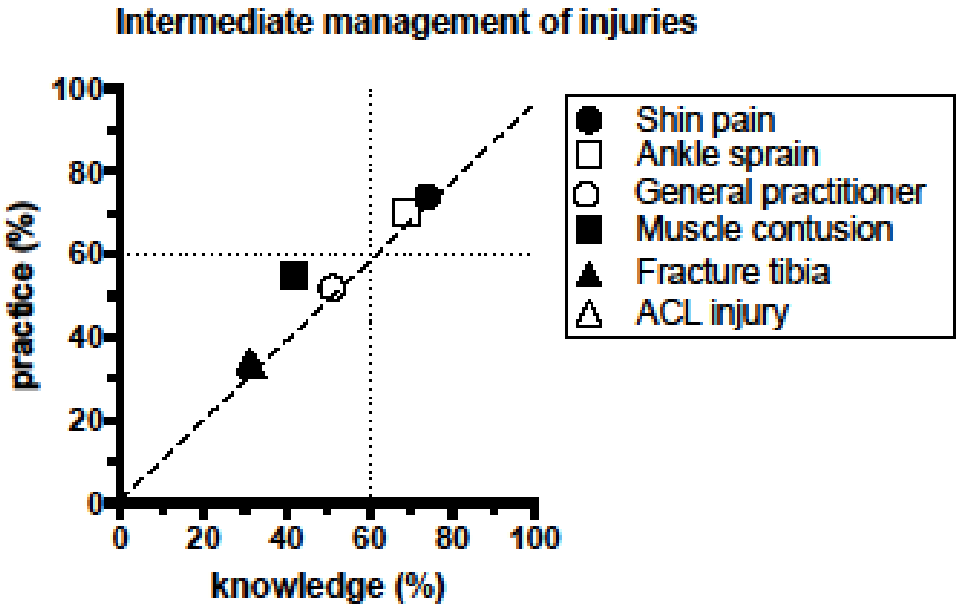
To establish the participant's usual practice with the conditions described above, the participants were asked "*Do you provide non-surgical treatment to the following sports injury problems?"* Table 4.24. Shows that the injuries that are frequently treated with non-surgical methods are shin pain 35 (74%) and ankle sprain 35 (70%) respectively.

Table 4.24: Type of treatment to the injuries below

Item No.	Non-Surgical	Un usual practice (x)	Usual practice (xx)	Total respondents
1	Shin pain	12 (26%)	35 (74%)	47
2	Ankle sprain	15 (30%)	35 (70%)	50
3	Muscle contusion	21 (45%)	26 (55%)	47
4	Concussion	22 (48%)	24 (52%)	46
5	Fracture tibia	29 (66%)	15 (34%)	44
6	ACL injury	28 (67%)	14 (33%)	42

X: frequent and very frequent; xx meant never, rarely and occasionally.

A comparison of practice (Table 4.24) and knowledge (Table 4.23) is shown in Figure 4.6 below. During the intermediate stage, both shin pain and ankle sprain management, knowledge and practice of intermediate care is the same and within acceptable level of 60% and above, however, other conditions, despite of practice being better than knowledge, it falls below the acceptable level.



n=44

Figure 4.6: The relationship between knowledge and practice scores during intermediate stage of care for the various conditions of an athlete following an injury from sports participation

(Shin pain, Ankle sprain, muscle contusion, fractured tibia and ACL injury).

Figure 4.6 shows that, during the intermediate stage, both shin pain and ankle sprain management, knowledge and practice of intermediate care is the same and within acceptable level of 60% and above , however, other conditions, despite of practice being better than knowledge, it falls below the acceptable level.

D. Rehabilitation of an injured athlete or player

The aim of the last phase of the study was to establish the common knowledge and practices of the sports resource providers during the rehabilitation stage of an athlete's injury. The context of this aspect of the study is referred to in Figure 2.2 part 4. The first question the participants were asked for this part of the study, "*For your job, are you required to manage or participate during a player's or athlete's rehabilitation phase*?" Sixty-nine % of the respondents (sports resource providers; n=95) usually get involved in the rehabilitation phase of the athletes and the other 42 (31%) do not get involved in the rehabilitation phase.

To establish knowledge of rehabilitation team required for a sports-related injury during this stage of recovery and eventual return-to-play among the respondents, the second question asked the participants: "*The following specialists are important during the*

rehabilitation phase of a player or athlete with a hamstring injury (Table 4.25)." The results indicate that 89% (n=78) of the respondents were in favour of physiotherapist, and the other popular choice was for physician 86% (n=76).

Table 4.25: Specialist team required for sports related injury rehabilitation

Item No.	Specialist in Rehabilitation	No agreement (x)	Agreement (xx)	Total respondents
1	Physiotherapist	10 (11%)	78 (89%)	88
2	Physician	2 (14%)	76 (86%)	88
3	Strength and conditioning expert	16 (18%)	71 (82%)	87
4	Nutritionist/dieticians	24 (29%)	59 (71%)	83
5	Psychologist and Sociologist	29 (35%)	53 (65%)	82
6	Nurse	33 (40%)	49 (60%)	82
7	Surgeons	42 (52%)	39 (48%)	81
8	Sports analyst	46 (55%)	38 (45%)	84
9	Occupational therapist	43 (53%)	38 (47%)	81
10	Cardiologist	54 (67%)	27 (33%)	81
11	A chiropractor	57 (74%)	20 (14%)	77
12	Traditional bone setter	68 (80%)	17 (20%)	85
13	Urologist	64 (81%)	15 (19%)	79

x: undecided, disagree and strongly disagree; xx: agree and strongly agree.

The third question the participants were asked for this section: "*The following statements are applicable to you during the rehabilitation phase of an injured player or athletes*?" As shown in the Table 4.26 below, 87 (n=83)) of the respondents indicated that *respecting the rights and dignity of their patient* was the most applicable statement to them (Uganda, sports resource providers). This was followed by *allowing nutrition and dietary advice to be given to athletes* 78% (n=75).

Table 4.26: The common practices during athlete's recovery period

Item No.	Rehabilitation	Unusual (x)	Usually (xx)	Total respondents
1	I respect his/her dignity or rights as other patients	12 (13%)	83 (87%)	95
2	I monitor & evaluate his/her recovery stages on everyday basis	21 (22%)	75 (78%)	96
3	I / we allow advise on diet and fluids	21 (22%)	75 (78%)	96
4	I allow talking to the teammate and visiting friends	23 (24%)	73 (76%)	96
5	Work with families and friends	21 (23%)	70 (77%)	91
6	I / we evaluate athlete/player's recovery depending on athletes' symptoms resolution	26 (27%)	70 (73%)	96
7	It is the duty of a physiotherapists to perform periodic health examination and pre-participation examination	36 (38%)	60 (62%)	96
8	I don't work with Sports physicians	36 (38%)	58 (62%)	94
9	I advise on use of banned substances	40 (43%)	52 (57%)	92
10	It is a duty of a coach to perform a periodic health evaluation and pre-participation examination	63 (66%)	33 (34%)	96
11	I / we allow religious Leaders or cultural leaders as part of the team during rehabilitation phase	62 (67%)	31 (33%)	93

xx: frequent and very frequent; x meant never, rarely and occasionally.

4.5 SUMMARY OF STUDY TWO

The overall goal of this thesis was to identify barriers to implementation of best medical care practices in Uganda. This study has further contributed to this goal by establishing the level of knowledge and behaviour sports resource providers have to for managing athlete's well-being and health. Results are summarized according to the three section of the research instrument (A= demographic; B= well-being of athletes; C= best medical care behaviour).

The demographic results revealed the following: There was a response rate of 35% (139 participants). A diversified group of participants from 11 sporting codes participated in this study, the majority coming from athletics (30%), rugby (27%), basketball (24%) and football (19%). The participants were coaches (48%), managers (31%) and medics (18%); the majority of these participants were male (83%) and doing part time sports work (58), details Table 4.4. The average age was 24 ±2 years. Their experience in sports participation ranged from 10-19 years (41%) and 0-9 years (38%), with 43% having competed at elite level, and 42 at the amateur levels level, details Table 4.5.

Results in section B (well-being of athletes) revealed that 93% of the sports resource providers contribute to the athlete's well-being. The competence in managing athlete's well-being was mostly in coaching (98%), injury prevention and management (96%), and sports performance (96%). However, the lowest competence (71%) was found in managing athlete's doping behaviour. Regarding information about the international sporting bodies, 89% of the participants knew and were aware of the goals and objectives of these bodies. The results revealed that the international sports organisations and their resources were not sufficiently utilized to seek information about athlete's well-being. The most utilised organisations were IAAF (34%), IOC (27%), FIBA (23%) and FIFA (16%).

Results in section C (best medical care behaviour) are sub-divided into prevention, acute or emergency care, intermediate care and rehabilitation. During the preventive care stage, the knowledge of Pre-participation Health Examination (PPHE) measure among the participants was much higher (88%) than knowledge of the Periodic Health Examination (PHE); 43%). Twenty per cent of the participants indicated that they usually use PHE to monitor athlete's well-being whereas 26% uses PHE to educate athletes about health risky behaviours. The acceptable level of practice and knowledge was defined at 60%. In all cases the knowledge on the topic was higher than the practical application of that topic; however, both knowledge and practice were always lower than 60%, and by definition unacceptable.

During the acute stage of the injury, 54% of the participants indicated they assist athletes at this stage of health care. The knowledge on the appropriated use of first aid protocols (RICE; DRABC; ABC; ABCDE; SALTPS) was higher than practice of these protocols. However, for the RICE protocol, both knowledge and practice were above the acceptable limit (60%). The knowledge and practice for injury recording among sports resource providers was low (11%, on average). The last section in acute care was the referral of injured athletes; the knowledge (65%) about referring injured athletes to specialists (general practitioner, sports physician, physiotherapists, radiologist, orthopaedic and traditional healer) was above the practice (32%). Both knowledge and practice of referring athletes to a traditional healer was low. During the intermediate stage of injury management, 50% of the participants indicated to provide care at this level. However, results again indicated knowledge and practice of the guidelines were below the acceptable standard. Knowledge and practice about the management of strain and sprain was a defined acceptable mark of 60% compared to other conditions (muscle contusion, fractures and ACL injury). During the rehabilitation and return-to-play stage, 69% of the participants were involved in

helping athletes at this level of recovery. The comparison between knowledge and practice of recovery guidelines among the sports resource providers did not demonstrate a clear difference at this stage.

In conclusion, the study established the barriers to the implementation of best medical care practice. Majority of the sports resource providers' knowledge about athletes' well-being was good, however, the competence to assist athlete on issues regarding doping was lacking. The websites of the international sporting bodies were underutilised to access information about the care of athletes. This group also reported a low-use of pre-participatory medical examination and periodic health evaluation for monitoring the athletes' health. Majority of the components/themes of acute injury care and intermediate care were below acceptable standards. The group demonstrated sufficient competence when it came to the rehabilitation stage, however, this was not put in practice as of most of the athletes cleared themselves to return-to-sports participation. The concern about athletes' health care shifted to the state of sports and medical facilities. The next chapter presents information about the sports and medical facilities used by Ugandan athletes.

4.6 DISCUSSION

4.6.1 Introduction

In Study one (Chapter, 3), there were inconsistencies and inadequacies for many experts' recommended guidelines on sports injury management. To magnify on such results, Study Two (Chapter, 4) aimed at establishing if the participants' knowledge levels were associated with the inconsistencies, and inadequacies in practice observed during the management of injured athletes. These results contribute to the overall aim of the thesis that is trying to create a better understanding of the barriers to sports best medical practices in Uganda.

For this section, the discussion is divided into the following five subsections.

(i) Demographic results
(ii) Athlete's well-being
(iii) International sporting governing body's Preventive knowledge and practice
(iv) Emergency knowledge and practices
(v) Intermediate phase and rehabilitation knowledge and practice

4.6.2 Demographic results

There was a relatively low response of the participants for this study (35%). The reason for this poor response is not be clear because several steps were taken to improve compliance. However this response is similar to other studies on athlete's health services delivery (Wilke et al., 2018; Cuningharm, 2002; King, Hume & Trevor, 2010). For example, an assessment of the knowledge and practice of the first aiders dealing with youths from the United Kingdom football league had a response rate of 34% (Cunningham, 2002). In a study conducted by Wilke et al (2018) on all the elite-level basketball coaches, there only 23% who responded to the survey. There have been claims that the lack of participants' reservations in such studies that involve elite clubs is due to the time constraints and the busy schedules associated with these groups of people (Irani & Richmond, 2015). Similarly, another reason for the outcome of the responses in Uganda could be that the coaches, managers and health care professionals may not have time to finish the questionnaire (14 pages, Appendix 11). They are involved in coordinating the daily training, preparation for traveling and also competitions. Also, most of the participants were part-timers in sports activities, which may have placed a burden on their time.

4.6.3 Athlete's well-being

In this study, although the majority of the participants (93%) acknowledged the importance of assisting with the athlete's well-being, they seemed to be incompetent in managing aspects of doping management. There is a critical need to improve athlete's well-being (welfare) according to the international sports bodies (Ljungqvista et al., 2009), but the research on this topic is still scanty. It is important for sports resource providers to understand the term well-being (King, Brughellli & Hume, 2013). Most studies on well-being have used athletes as the participants compared to the current study where the sports resource providers were examined for level of knowledge (Muwonge et al., 2015; Nazni & Vimala, 2010). A study of Ugandan athletes showed that athletes from the four sporting codes (athletics, basketball, football, and rugby) could only get 30% of doping information from their coaches (Muwonge et al., 2017). This study confirms the low knowledge of doping among the coaches. This should be a concern to Ugandan national sports institutions who manage doping control and shows there is a need to promote research and increase knowledge about doping practices among the sports resource providers in Uganda.

4.6.4 International sporting governing bodies

This study sought information about whether the participants were aware of the major International sports body's websites, and if so whether they accessed information on these websites. The results show that although a high proporation of the participants (89%) were awareness of the international sports organization, a much lower proportions (34 -7 %) utilised these websites for information (Table 4.3). The international sports governing bodies are the major advocates for improved medical services for athletes (Deroche et al., 2007; Weinberg, Vernau & Horn, 2013). As a consequence, these bodies continuously publish policy guidelines on the websites to assist sports resources providers with best practices to protect the athlete's health and safety (Casa et al., 2012; IOC medical commission, 2013; FIFA-Player's health, 2013; IRB-Player's welfare, 2013; IAAF-Medical manual, 2013). It is not known why the information on the websites is not accessed and used by the practitioners. In the case of Uganda, an underdeveloped country, one may claim that the sports resources providers, struggle to have access to internet services, and other software infrastructures such as computers. Further research is warranted to establish the barriers to accessing information on the international bodies' websites.

4.6.5 Preventive knowledge and practice

The findings of the current study indicate that the medical strategy of injury risk prevention knowledge and practice was lacking (Figure 4.3). While the medical pre-participation medical evaluation is now a mandatory sports health care policy from all the international sporting bodies (Ljunvista et al., 2009), the practice is still low in Uganda.

The evidence on Pre-participation health evaluation provides insight into the likelihood of an injury to happen is still evolving (Corrado et al., 2011b; Santos et al., 2015; Adami et al., 2019). Through the use of PPHE (medical history), Durant et al (1992) demonstrated a relationship between medical history (obtained from PPHE reports) and athletic injuries that required medical attention and could lead to miss one game or more games. Despite such a long-standing universal recommendation (Ljungvist et al., 2009), the knowledge among the sports resource providers is still low in the member countries. Moulson et al (2017) showed a 92% compliance of sports team physicians with a preparticipation medical evaluation of athletes. However, the cohort had 45% who were not screening use ECG approach for assessing Cardiac risk conditions in athletes. There mainly two reasons that were reported. The approach is not cost-effective, and the evidence that this can identify

athletes at risk of the cardiac condition is still evolving. Further research is needed to provide evidence that cardiac ECG screening is effective in identifying athletes at risk of cardiac arrest. Another study on physicians in USA, indicated that the physicians experienced mainly two barriers in the implementation of PPHE forms (Labotz & Bernhardt, 2015). The barriers were the lack of understanding on how to perform tests for all the items in PPHE form. Secondly the PPHE forms lacked standard outcome measures and required excessive time to complete the assessments adequately.

4.6.6 Emergency knowledge and practices

The results showed that the knowledge of what to do during acute care of an injury was greater than what was actually done in managing the athlete (Figure 4.4). Further, there was a decrease in the number of participants who opted to answer the questions that sought information on knowledge and practice of acute injury care [(75 (100%); to 43 (57%) (Tables 4.6-12)]. The explanation for the decrease in number of the participants on this topic may be indicative of the lack of knowledge on acute injury management (Cunningham, 2002; King, Hume & Trevor, 2010; Wilke et al., 2018).

The emergency care services in sports are distinctive clinical practices (Henehan et al., 2013). Therefore, the primary health service providers are required to undertake sports medicine fellowships to equip them with the skills to handle injuries (Zideman et al., 2015). For example, they need to know how to recognize, assess, manage and, determine the limitations of an injury in the acute stage (Cunningham, 2002). In the case of an unexpected event, they can seek additional care. In Uganda, adequate knowledge of first aid care is essential among all the sports resource providers. The lack of adequately trained first aid personal may increase the risk of injured athletes having complications with their injuries. Therefore, the services of well qualified first aider are vital (Emerich & Nadolska-Gazda, 2013).

The reasons for the low level of implementation of recommended first-aid guidelines can be attributed to the poor state of the facilities and equipment for emergency care in all the sports and medical facilities departments. Another factor is the lack of national health care policies to mandate athletes, and sports federations in Uganda. There should be a government sports policy to enforce best practices in first aid at sports events. This is critical, in a country like Uganda, which has often has poorly equipped treatment rooms within the sports facilities which are sometimes far from medical facilities.

A further weakness was noted during the athlete's injury documentation. In the current study, 49% of the participants accepted that they are required to record and monitor athlete's injuries and illnesses. But the findings showed the majority of the participants lacked knowledge and practice for the documentation of sports injury (Table. 4.14). The first step towards injury prevention is to measure the extent of the problem (Van Mechelen et al., 1992). The international sports bodies recommend member countries to make epidemiological studies a priority during medical services in sports (Finch, Valuri & Ozanne-Smith, 1999; Ekegren, Gabbe & Finch, 2016; LeBrun et al., 2017).

4.6.7 Intermediate phase and rehabilitation

The last part of the questionnaire required participants to indicate their level of understanding and practices on various items under intermediate and rehabilitation medical care. There was insufficient information on practices for certain types of injuries as demonstrated by Figure 4.5. The practices were below the acceptable level of 60% (Figure 4.6). These findings are concerning because inappropriate and inadequacy medical services at intermediate levels may delay the rehabilitation process and return-to-sports participation (Broglio, 2018). There is a paucity of published research comparing available practices to evidence-based practices on sports injuries (King, Brughelli & Hume, 2013).

Despite the above weakness, the overall results of the current study regarding knowledge and practices on various items on the intermediate and rehabilitation stage of injury athletes did not yield substantial differences (Figure 4.6). Contrary to this study, Moreau et al (2015) produced a report on chiropractors' knowledge and practices of concussion injury prevention and management in the United States of America. The authors reported that 95% of the participants, had knowledge that was appropriate for the cases received, with some participants showing an indication extra high level of understanding of the materials used to manage the injuries. Other authors who studied first aiders, sports administrators and coaches respectively have reported similar trends of events to the current study (Cunningham, 2002; King, Brughelli & Hume, 2013; Wilke et al., 2018).

In previous reports, authors have argued that the national sports authorities, including governments, should partner with expert bodies in supporting strategies to improve the knowledge and best-practice medical principles needed to manage athletes (Cunningham, 2002; King, Brughelli & Hume, 2013; Quarrie et al 2019; Wilke et al., 2018).

Further, the last item in the current study investigated the knowledge and practice of the principle of a multidisciplinary approach while managing athletes' injuries. The results showed that the majority of the participants were knowledgeable about teamwork. This is in accordance with the review that showed a single section of health service providers cannot sufficiently manage a sports-related injury (Tee et al., 2017). Also studies have shown that concussion injuries require interdisciplinary and multidisciplinary strategies (Pabian et al., 2017; Sarmiento, Donnell, Bell, & Hoffman, 2019).

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4.7 CONCLUSION

This study has shown that the participants' knowledge and understanding of the components/themes of the athlete's well-being, and international sports bodies were good. However, this knowledge was not translated into best practices. Suggestions such as the lack of computers, internet, equipment, and inadequate sports policies may have been a problem. Further research is needed to confirm the above claims. Regarding knowledge and application of experts' recommended guidelines on prevention, emergency medical care, intermediate and rehabilitation care, the current study has shown the participants' knowledge and practice on PPHE/PHE was below the acceptable 60% mark. This could have been due to the lack of awareness and equipment to conduct the tests. The literature has also shown that there are time-constraints for the physician to conduct the test and the cost of the tests. Participants' demonstrated good knowledge and understanding of experts' guidelines on emergency care, however, the practices were below the acceptable mark of 60% for all the items. Further research should examine the state of facilities and equipment to service athletes before, during and after an injury.

CHAPTER 5

NATIONAL SPORTS AND HEALTH CARE FACILITIES

The previous study (Study Two, Chapter 4) established there were gaps in the knowledge and practices among the sports resource providers regarding best medical practices in sports, and compliance in the implementation process. This study led to the question about the state of the facilities in Uganda that are used to service athletes. This question will be addressed in this chapter.

Firstly, I will present a brief facility background (sports and health) including facility guidlines published by sports bodies and expert groups, before describing the research objective. Then I will describe the research methods used to collect data followed by the results and discussion.

5.1 BACKGROUND

The standard of the sports or health (medical and high performance) facilities and the environment play a major role in the realization of the athletes' objectives (Stoner, Freeman & Gilbert, 1996). Certain types of injuries and lifestyle behaviors are associated with poor sports infrastructure (Orchard et al., 2005; Takemura et al., 2007; Vlad et al., 2018). For example there are risk factors to injuries such as exposed sprinkler heads, uneven playing surface, type and state of grass/turf, soil, surface hardness, and traction. Also, playground surroundings such as spectator perimeter walls and unpadded posts, and fixtures have a risk of injury. The lack of lights and security personal add to the risk of these injuries. The risk may be compounded by inadequate first aid services and equipment. Lastly poorly maintained change rooms and poor toilet and hygiene safety (Swan et al., 2009) can also compromise the health of athletes. Currently, there are manuals that have policy-guidelines describing the ideal facilities, and equipment to manage an athlete’s health and safety. The goal of these guidelines is to create a safe environment for athletes’ sporting activities (Sondhi, 2016). The next section presents the literature on available policy-guidelines on sporting facilities including, medical and high-performance centre).

5.2 THE LITERATURE

5. 2.1 Outline of the literature on the facilities.

These facility guidelines are based on the recommendations of four international sporting bodies' (athletics, basketball, and football and rugby union), expert groups and World Health Organisation (WHO) (IAAF-medical manual, 2012; Guide to the safety of sports ground, 2008). The next section provides descriptive information under the headings of sports facilities, medical centre facilities and high-performance centre facilities. The subheadings under each theme are shown below.

A. Sports facilities

(i) Playing field or sports court quality

- Grass cover/floor or surfaces in case of basketball sport
- Storage of field or court related equipment
- Goal posts and crossbar in case of rugby sport should padded

(ii) Hygiene and sanitation

- Shower rooms
- Toilet facilities

(iii) Stadiums health care services

- Medical/health service providers
- Ambulances
- Waiting rooms
- Treatment/working rooms
- Medicine or drug storage facilities
- Records sections
- Doping facilities
- Toilet facilities
- Washing facilities

B. Medical centre facilities

I. The structure and planning
II. Emergency care facilities
III. Specialist availability
IV. Rehabilitation department

V. Specialised departments

C. High-performance centre facilities

I. Location
II. Maintenance and safety
III. Accessibility
IV. Variety of programmes or services offered
V. Physical training programme
VI. Educational and motivational programme
VII. Communication mechanisms
VIII. Personal services
IX. Special needs care services
X. A variety of exercise activities
XI. Certified/specialised staff

Therefore, the main objective of this investigation is to establish the state, and availability of resources (human and equipments) of the various sports, medical and high-performance facilities that serve athletes in Uganda.

5.3 METHODS

5.3.1 Study setting and facility sample

The study was conducted for 10 months in 2015 in Uganda. The observational areas were the facilities used by athletics, basketball, and football and rugby union athletes. In addition, medical and gymnesuims (*hereafter reported as high-performance centres*) were assessed. The number of clubs in the sport of athletics, rugby, basketball, and football were reported in the previous sections (3.3.2). For rugby, eight field facilities were recorded; for basketball, 24 courts were surveyed, for athletics, 30 athletic arenas were surveyed and in football, 10 stadia were surveyed. In addition, the high-performance facilities were visited, as they are used to prepare athletes to return-to-play through the rigorous rehabilitation programmes, including return-to-play protocol. In this context, high-performance facilities included the gymnasuim, swimming pool, areas for medical and physical consultations, physical testing laboratories and areas for exercise training.

Inclusion criterion

All facilities (stadium, court, medical and high performance) used by top level clubs, and national team athletes from football, rugby, athletics and basketball were included.

Exclusion criterion

Four medical facilities required observation taxation levied on researchers. These facilities were excluded from the study.

5.3.2 Design and methods

The study used a cross-section observational survey design, with a quantitative methodological approach to complete data collection.

5.3.3 Research tool

Figure 5.1 illustrates the process that was applied when developing the checklists as tools for assessing sports, medical and high-performance facilities.

Development of the survey tools

The framework used for designing the checklists is shown in Figure 5.1. It has four phases;

- First, was the conceptualization, based on the main aims of the overall research project; required standard of the facility according to the recommended guidelines, rules and regulation from international sports bodies and WHO. Other recommendation guidelines were sought from sports, health and high-performance centres with international accreditation.
- Second, was the planning for the desired checklist as per facility category (stadium, basketball-court, hospital or high-performance centres)
- Third, was to the expert review committee, a scientific group (a multi-disciplinary group) from the Division of Exercise Science and Sports Medicine, based at the Sports Science Institute of South Africa. This group reviewed the checklist for; criteria and scale rating, content sports injury prevention and management. Thereafter the necessary revision and adjustments were made to all the checklists considering their recommendations. Comments were further sought from four experienced sports resource providers: sports physician and physiotherapist, a coach, and a sports manager. Their suggestions and comments were further considered, and the checklists were again edited accordingly.

- Final phase was the validation of tools, through piloting the checklists in Kenya a neighboring country to Uganda. The pilot study intended to establish the time it takes to complete the observational checklists, logic of the themes and sub-themes and challenging sections within the tools.

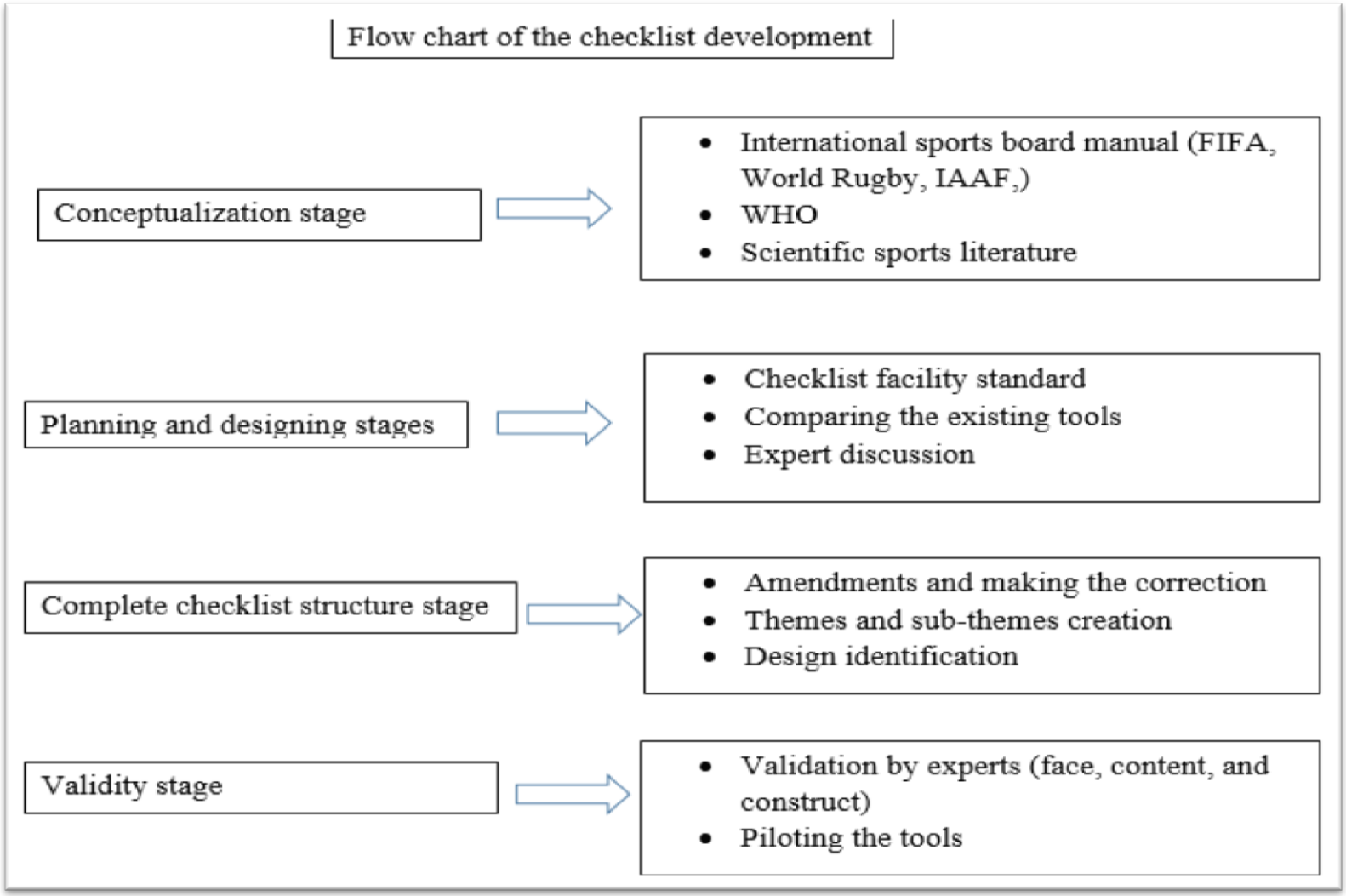

Figure 5.1: Flow chart of checklist development stages

Description of checklist for each sport, and health care facilities

This section provides information on which the checklist items details were obtained. It further shows the compilation and final structure of the checklist tool for the facilities for each sport.

Sports facilities

a. Athletics

The components/themes included in the checklist were identified from the IAAF track and field facilities manual (Matrahazi & Wilson, 2008). In addition, other sports federation manuals were used to provide the missing information, especially medical support to the sports environment. These manuals include: rugby player's welfare (World Rugby, 2018) and FIFA football stadiums manual (FIFA, 2011). The items were then categorized under themes such as: stadium management, hygiene and sanitation, sports participation quality of the athletic arena surface and stadium health care services. Under these themes, they were further categorized into sub-themes. In this context, *quality* means the degree to which participation arena increase the likelihood of desired outcomes the details of these items are found in the Appendix 4.

Final checklist structure, layout and answering format

Under each theme, there were several components/themes or observable items to which a grading system was applied. The number of items varied from 4-9, depending on each theme. The overall checklist consisted of 34 items. For each observable item, the grading ranged from *nil to complete*. A grade of *nil (0)* meant that there was no observable item in the facility, *poor* (3) grading indicated that the item was considered to be extremely below standard, *partial* (2) grading was considered to be of average standard, and a grade of *complete* (1) was considered the required standard, according to the international sports specifications for that facility item.

The complete athletics checklist had two parts. The first part was concerned with demographic information and the second part focused on stadium facility information. The items in the demographic part were: facility name, location in the country, manager or administrator's contacts, age, gender and education level. The second part consisted of the themes and grading mentioned in the proceeding paragraph. Figure 5.2 below shows the demographic as well as the answering format for part two of the checklist tool.

In the stadium information part of the checklist, the components/themes were again grouped into five (5) categories. The categories include: the stadium management and *facility safety items, including the field and track status; hygiene and sanitation, participant's field surface* and the *stadium health care services*. The details of each category are shown in Appendix 14

Final checklist structures, layout and answering format

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Uganda National Athletics Sports Facility checklist

To be completed by the researcher

Facility Name..... District.....
Investigator.....
Stadium authorities' details: Date.....
Age..... Phone.....
Sex..... M F Email: .....
Qualification.....
Operation:
Days..... Hours.....to.....

	Specialist and Items	Poor	Partial	Complete	Comment/barriers
A	Stadium management & Facility safety items				
	I. Sign posts indicating direction				
	II. Stadium code of conduct				
	III. Civil protection unit (police etc) & CCTV cameras				
	IV. Field facility	Yes	No	N/A	Comment/barriers
	a. Oval & 8 straight lanes for 100 & 110m hurdles				

Figure 5.2: Athletics stadium facility checklist

b. Basketball

The phases of developing a basketball court facility checklist are similar to the other sports facilities. However, the components/themes included in the checklist were identified from the following sources (citations):

- Guide to basketball facilities (FIBA stuy centre, 2009)
- Health/Fitness facility standards guidelines (Sanders, 2009).
- Further resource materials used include the: IAAF track and field facilities manual 2008 Editon (Matrahazi & Wilson, 2008).

The checklist had two parts, the demographic part and the court facility part. The items in the demographic part were explained in the previous section. For the basketball court facilities, the components/themes were again grouped into three categories. The categories were: the *facility and operation status*, *hygiene and sanitation*, basketball court status and *medical care services*. Details of each part and category are shown in Appendix 6

Final checklist structures, layout and answering format

The final basketball court facility checklist structure, layout and answering format is similar to that of other sports facilities; the details of the checklist shown in Appendix 6

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Uganda National Basketball Sports Facility checklist

To be completed by the researcher

Facility Name..... District.....
Investigator.....
Manager details: Date.....
Age..... Phone.....
Sex..... M F Email: .....
Qualification.....

Operation:
Days..... Hours.....to.....

	Specialist and Items	Poor	Partial	Complete	Comment/barriers
A	**Facility and operation**				
	I. Stadium operational manual				
	II. Communication tools on the field (cell phone or walkie takies				
	III. Court marked lines (0.05m width)				
	IV. Support spectator area available & accessible for People With Disabilities				

Figure 5.3: Basketball court checklist

c. Football checklist

The FIFA football stadiums manual (FIFA, 2011) was used to identify components/themes/themes to be included in the football checklist. In addition, other sports federation manuals were used to provide the missing information, especially medical support to the sports environment. These manuals include: rugby player's welfare (World Rugby,

2019a) and IAAF facility manual (Matrahazi & Wilson, 2008). The phases of developing the rugby union football field facility checklist are similar to those explained above. The details of the checklist is shown in Appendix 7**.**

Final checklist structure, layout and answering format

The Figure 5.4 below shows the demographic as well as the answering format for part two of the checklist tool.

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Uganda National football Sports Facility checklist

To be completed by the researcher

Facility Name..... District.....
Investigator.....
Stadium authorities' details: Date.....
Age..... Phone.....
Sex..... M F Email: .....
Qualification.....

Operation:
Days..... Hours.....to.....

	Specialist and Items	Poor	Partial	Complete	Comment/barriers
A	**Stadium management**				
	I. Sign posts indicating direction				
	II. Stadium code of conduct				
	III. Civil protection unit (police, etc) & CCTV cameras				
	IV. Goal posts & Nets white, with grey goal post supports Plus spare goal posts, nets and corner flags close to field				

Figure 5.4: Football checklist

d. Rugby

The phases of developing the rugby union football field facility checklist are similar to those explained above. However, components/themes included in the checklist were identified from the following citation below, the full references are identifieable in the reference list:

- Sport and Recreation Infrastucture Provision and Management (Vasu, 2010)
- Laws of the Game Rugby Union: SARU version (World Rugby, 2019b), provided details on the field content

- World Rugby Player welfare (World Rugby, 2019a), provided rugby union pitch guidelines
- IAAF track and field facilities manual (Matrahazi & Wilson, 2008).
- Risk assessments (Health and Safety Authority, 2016)
- Establishing Guideline Performance Standards for Sports Fields in Australia (Nil, 2011).

Health care facilties

The components/themes in the health care facilities are similar to the athletics checklist (Figure 5.2 above). The details of each category and the final checklist structure, layout and answering format are shown in the Figure 5.5 below.

e. Medical facility

The initial stage of development of the medical facility checklist was similar to the sports facilities above. The components/themes of the checklist were identified from the following reference sources below:

- Private Facility Inspection 2018 checklist for hospitals (Government of South Australia, 2018);
- Safe Hospitals Initiative: Hospital Safety Index Guide for Evaluators (World Health Organisation, 2015)
- Transforming health care through research and education (Research and education trust, 2013)
- NSF International Standard for Health/Fitness Facilities (NSFInternational standard development process, 2009)

To identify themes to be included in the checklist for medical facilities, I relied on my experience as a sports health care provider (physiotherapist), as well as the conceptual model for the “best healthcare in sports” Figure 2.3

The checklist contained the following themes: parking, maintenance and environment, available medical specialists, hygiene and sanitation, facility area and departments/units. The department theme was further subdivided based on the services offered, such as: trauma, rehabilitation, nutrition and catering, research and training/prevention, gynecology and

obstetrics, surgical, neural, mental health, pharmacy, outpatient, radiology, laboratory, counseling and support service, and oral health care.

The final medical checklist structure, layout and the answering format

The final medical facility checklist structure, layout and answering format is similar to the other sports facilities (see Figure below); the details of the checklist is shown in Appendix 2

Uganda National Medical Centres Facility checklist

To be completed by the researcher

Facility Name..... District.....
Investigator.....
Medical Superintendent Authorities' details: Date.....
Age..... Phone.....
Sex..... M F Email: .....

Operation:
Days..... Hours.....to.....

	Specialist and Items	YES	NO	N/A	Comment/barriers
A	First impressions				
	I. You instantly feel "at home" with staff you meet?				
	II. Do staff and members look like they're enjoying themselves?				
B	Facility and operations				
	Location	**Completely**	**Partially**	**Poor**	
	I. Is the facility an easy drive to and from & clear sign posts?				

Figure 5.5: Medical centres checklist (Appendix 2)

f. High-performance centre

The phases of developing the high-performance centre facility checklist was similar to the sports facilities above. The components/themes in the checklist were identified from the following reference sources:

- Health/Fitness facility standards guidelines (Sanders, 2009)
- Health and Safety and Equipment Maintenance (FITPRO, 2017)
- Occupational Health and Safety Specification for ACSA (Airports Company South Africa, 2008).

The guiding principles were similar to this mentioned above for a medical facility. The checklist contained the following themes: impression to customers, facility and operations, programmes offered, equipment, amenities and auditing of equipment, staff and management and business practices, contracts and fees. Each theme was further subdivided into sub-themes, such as: did the facility and operation have location, parking, maintenance

and safety, and accessibility items? For the programme offered, did it include, how to get started; the physical training programmes; education and motivational programme; items concerned with communication; items concerned with personal services; items concerned with special needs; variety and convenience? The subthemes for the equipment, amenities and auditing of equipment category, the sub-themes included their condition and availability, diversity of equipment/amenities offered, and specific age-friendly features; the strength and cardiovascular equipment age-friendly features items. The staff and management sub-themes included, personal training and qualifications, and social integration. The business practices, contracts and credentials sub-themes included: general issues, contract and fees, and items on the facility credential items.

Uganda National Sports High Performance Centre Facility checklist

To be completed by the researcher

Facility Name..... District.....
Investigator.....
Stadium authorities' details: Date.....
Age..... Phone.....
Sex..... M F Email: .....
Qualification..... Professional.....

Operation:
Days..... Hours.....to.....

	Specialist and Items				Comment/barriers
A	First impressions	**Complete**	**Partial**	**Poor**	
	I. You instantly feel "at home" with staff you meet?				
	II. Do staff and members look like they're enjoying themselves?				
B	Facility and operations	**Complete**	**Partial**	**Poor**	
	Location				
	I. Is the facility an easy drive to and from?				
	II. Is there a good mass-transit system that				

Figure 5.6: High performance centre facility checklist (Appendix 3)

5.3.4 Procedure of data collection

The University of Cape Town Study and Research committee and Makerere School for Public health approved the study protocol and consent forms (HREC REF: 584/2014 and Prtotocol 242). Further permission was sought for this observation study at the sports facilities; the appointments were made through executive members of sports clubs to meet the manager or administrators of the sports facilities. At the medical facilities and high-performance centre, permission were sought through the medical superintendents and hospital research committees and high performance directors respectively. On the day of the appointment, the researcher explained the project to the facility managers/administrators by

the researcher. They were provided with an information sheet, but also requested for a hard copy of the checklist after the observation study was carried. Upon signing the consent form, the research team went ahead with the observation of sports facilities, assisted by facility authorities. The checklist was based on only the observed items in and around the facilities.

A. Data storage

The checklists were stored at the research office, in a different location from the research sites. The principle researcher kept the key to the office.

B. Data analysis

The data were extracted from the checklists into an excel spreadsheet. The data were further imported to Stata version 14 for analysis (StataCorp LLC, 4905 Lakeway Drive College Station, Texas 77845-4512, USA). Descriptive statistics were used to summarize the demographic variables, and all the observed responses on the checklist items were analyzed using frequencies and percentages.

5.4 RESULTS

Table 5.1 shows the number and the distribution of facilities for athletes in Uganda participating in regional, continental or international competitions in athletics, basketball, football and rugby.

Table 5.1: Distribution of athlete's sports facility in Uganda (n=58)

Sports codes	City centre	Up country	Total
Athletics	3 (14%)	19 (86%)	22
Basketball	9 (60%)	6 (40%)	15
Football	4 (33%)	8 (67%)	12
Rugby union	3 (33%)	6 (67%)	9

Although there was a full account of each facility, only items deemed useful to the implementation of best medical care practice in sports in a given facility were included in the analysis.

The following Tables 5.2 to 5.9 show items found in the facility checklist. They have been divided according to sporting codes. These items have been grouped under various components/themes: the facility management, facility planning and structures, hygiene and sanitation, stadium health care and quality of playing surface. Each component item is further graded as *poor* or *partial* or *complete* according to the state in which the item was found. The definition for poor, partial or complete has been provided in the methodology section). The percentage shown in the tables is an average of the overall percentage of facility items for that sporting code.

5.4.1 Facilities for athletics

The overall facility items lacked complete quality standard grade under the facility management theme/component. Table 5.2 below shows that 95% of the facilities had *poor* contingency plan, 88% had *poor* communication and 82% had *poor* emergency services respectively. In this context, a *contingency plan* sets out the action to be taken in response to incidences that may occur at the sports venue were an athlete's life may be at risk when there is a disruption in the normal operations (FIFA, 2013). Similar results were established in the "facility planning and structure components/themes". Forty one percent (41%) of the facilities had *poor* support spectator areas and 59% of the facilities had *poor* change rooms. For the component of "stadium health care", most of the facility items were regarded as *poor*, however, the nursing and first aid items were well represented in the *partial* grade in the 73%

and 82% of the facilities respectively. None of the athletic facilities had doping stations, injury surveillance system, spinal boards and basic life support in all the athletic facilities (Table 5.3).

Table 5.2: Athletic facility components/themes/themes and items (n=22)

No	Item/variable grading	Poor	Partial	Complete
A	**Facility management**			
1	Emergency services	82%	18%	-
2	Contingency plan	95%	5%	-
3	Communication	88%	12%	-
B	**Facility planning & structures**			
1	Support spectator area	41%	59%	-
2	Change rooms	59%	41%	-
C	**Hygiene and sanitation**			
1	Toilets	60%	40%	-
2	Shower rooms	68%	32%	-
D	**Stadium health care**			
1	Doping station	100%	-	-
2	Administrator's health care awareness	90%	10%	-
3	Medical care rooms	95%	5%	-
4	Ambulance	90%	10%	-
5	Emergency plans	86%	14%	-
6	Injury surveillance	100%	-	-
7	Medical doctors	86%	14%	-
8	Nurse	27%	73%	-
9	Physiotherapist	77%	23%	-
9	Ambulance personal	64%	36%	-
10	First aid personal	18%	82%	-
11	Running water	86%	14%	-
12	Examination couch	95%	5%	-
13	Spinal board	100%	-	-
14	Basic Life Support training	100%	-	-

5.4.2 Facilities for basketball

The study established that none of the items in the "facility management" theme/component (emergency services, contingency plan and court communication; Table

5.4), were within a *complete standard* grade. Table 5.3 shows that "facility planning and structure" items (spectator areas and change rooms) had *partial* grades ratings in 50% of the basketball facilities studied. There were similar results found in the "court quality", "hygiene and sanitation" themes/components (playing surface, courted marked, toilets and shower rooms).

For the theme/component of "stadium health care", only the first aid personal services were in *complete* (8%) and *partial (92%)* standard for the basketball facilities studied respectively. Eight percent of the the facilites were rated complete for the physiotherapist item. All the other items under stadium health care were rated as either *poor* or *partial*.

Table 5.3: Basketball facility components/themes and items (n=15)

No	Item/variable grading	Poor	Partial	Complete
A	**Facility management**			
1	Emergency services	67%	33%	-
2	Contingency plan	75%	25%	-
3	Communication	77%	23%	-
B	**Facility planning & structures**			
1	Support spectator area	33%	50%	17%
2	Change rooms	42%	50%	8%
3	Fence protection	73%	27%	-
C	**Court quality**			
1	Playing surface standard	40%	50%	10%
2	Court marked	9%	64%	27%
D	**Hygiene and sanitation**			
1	Toilets	42%	58%	-
2	Shower rooms	42%	58%	-
E	**Stadium health care**			
1	Doping control station	83%	17%	-
2	Medical care rooms	87%	17%	-
3	Ambulance	83%	17%	-
4	Emergency plans	67%	33%	-
5	Injury surveillance	100%	-	-
6	Medical doctors	67%	33%	-
7	Nurse	67%	33%	-
8	Physiotherapist	58%	33%	8%
9	Ambulance personal	87%	17%	-
10	First aid personal	-	92%	8%

5.4.3 Facilities for football

The analysis of the facility management theme/component for football **(**Table 5.4), showed that none of the items had a *complete* standard grade rating. However, for the component of "facility planning and structure", the "spectator area" item (67%) and "change rooms" (55%) had a *partial* rating for the required standard in the 67 % and 55 % of the facilities in the country respectively.

For the playing field component **(**Table 5.5), 75% of the facilities had *complete* standards for field dimensions and 50 % of the facilities had *partial* grass cover. And none of the facilities had *complete* toilet and shower rooms stands in the "hygiene and sanitation" component.

Similar to the basketball facility health care services, the results show the first aid personal services were *complete* in 9% and *partially complete* in 64% of the football facilities studied. None of the other items for "stadium health care" component had a standard grade as published by the international sporting bodies **(**Table 5.4).

Table 5.4: Football facility components/themes and items (n=12)

No	Item/variable grading	Poor	Partial	Complete
A	**Facility management**			
1	Communication	88%	12%	-
2	Ambulance services	66%	34%	-
3	Contingency plan	75%	25%	-
B	**Facility planning & structures**			
1	Support spectator area	27%	67%	10%
2	Change rooms	36%	55%	9%
3	Fence protection cushion	73%	27%	-
C	**Playing field quality**			
1	Playing dimensions	8%	17%	75%
2	Glass cover	8%	50%	42%
3	Buffer zone	18%	82%	-
D	**Hygiene and sanitation**			
1	Toilets	60%	40%	-
2	Shower rooms	36%	64%	-
E	**Stadium health care**			
1	Doping control station	100%	-	-
2	Medical care rooms	89%	11%	-
3	Ambulance	82%	33%	-
4	Emergency plans	78%	22%	-
5	Injury surveillance	91%	9%	-
6	Medical doctors	67%	33%	-
7	Nurse	67%	33%	-
8	Physiotherapist	56%	22%	22%
9	Ambulance personal	55%	45%	-
10	First aid personal	27%	64%	9%

5.4.4 Facilities for rugby union

The overall "facility management" component did not have a complete quality standard grade. For example, Table 5.5 below shows that 89%, 78%, and 88%, of the facilities had *poor* emergency services, contingency plans and communication respectively. Under the "facility planning and structure" component, none of the facilities had fence protection around the playing field, and 89% had *poor* change rooms. The majority (89%) had *partial* support "spectator areas". In the category of hygiene and sanitation component, 78 % of the rugby facilities had *poor* shower rooms, and 56% had *poor* toilet units (Table 5.5).

For the component of "stadium health care", most of the facility items were regarded as *poor*. However, in 55% of the facilities, the administrators were aware of health care services for athletes. None of the facilities had injury surveillance services and basic life support training (Table: 5.5).

Table 5.5: Rugby union facility components/themes and items (n=9)

No	Item/variable grading	Poor	Partial	Complete
A	**Facility management**			
1	Emergency services	89%	11%	-
2	Contingency plan	78%	22%	-
3	Communication	88%	12%	-
B	**Facility planning & structures**			
1	Support spectator area	11%	89%	-
2	Change rooms	89%	11%	-
3	Fence protection	100%	-	-
C	**Playing field quality**			
1	Grass cover (playing surface natural grass)	11%	-	89%
2	Playing dimensions (according to world rugby union)	11%	67%	22%
D	**Hygiene and sanitation**			
1	Toilets	56%	44%	-
2	Shower rooms	78%	22%	-
E	**Stadium health care**			
1	Doping station	100%	-	-
2	Administrator's health care awareness	11%	55%	34%
3	Medical care rooms	89%	11%	-
4	Ambulance	67%	33%	-
5	Emergency plans	78%	22%	-
6	Injury surveillance	100%	-	-
6	Medical doctors	67%	33%	-
7	Nurse	67%	33%	-
8	Physiotherapist	56%	22%	22%
9	Ambulance personal	67%	22%	11%
10	First aid personal	33%	44%	22%
11	Running water	78%	11%	11%
12	Examination couch	89%	11%	-
13	Spinal board	89%	11%	-
14	Basic Life Support training	100%	-	-

5.4.5 Medical care facilities

Table 5.6 shows the number and the distribution of the medical facilities in Uganda associated with providing medical services to the athletes assessed during the eight-month study period.

Table 5.6: Distribution of medical centres in Uganda used by athletes (n=24)

Location	Number of medical centres
City centre	7 (30%)
Up country	17 (70%)

Items under each component that are contained in the observational checklist used to collect data about medical centres in Uganda. Five components/themes were deemed useful in the implementation of best medical care practice in sports; "facility structure and planning", "facility emergency care division", "specialist team", "rehabilitation division" and "specialized divisions". Each component contained a varying number of items. The items were graded as *poor, partial* and *complete* standards during the observational period.

Among all the medical facilities, within the component of "structure and planning", the most highly rated items were: *cleanliness and maintenance* (29%), and *contingency plan* (21%) respectively. Several other items were categorized as *poor-partial* quality standard

Under "emergency care component", the *poorest quality* items were: 24 hours services (88%), bleeding equipment (79%), treatment and observational of medical or surgical cases (54%) respectively in majority of the medical centres. The highly rated items with *complete standards* according to the checklist were: *Chest Pulmonary Resuscitation* (CPR) /COMA poster display (63%) *poison manual* (58%) and *cardiac arrest* (42%) respectively. The rest of the items under this component were categorized as *poor-partial standard.*

Under the "specialist component", the poorest items were experts in neuro-surgery (88%), dieticians (71%) and optometry (58%) respectively. The items which had high grades in terms of quality were the lab experts (98%), doctors (92%) and the radiographer (71%).

Under the "rehabilitation component", *reconditioning* of athletes, *equipment* (ultra-sound therapeutic, fridge for ice and electro-therapy (79%) and *occupational therapy* services were rated *poor* in the majority of the medical facilities.

Under the "specialized component", the following items were rated poorest among the medical centres studied: the *lung function unit* (92%), *CT-Scan* (92%), *Magnetic Resonance Imaging* MRI (92%), and *neuro-clinics* (83%). However, *microbiology* (79%), *U/S diagnostic* (75%), *haematology unit* (67%) and *radiography unit* (63%) were rated as the best quality in the majority of the facilities.

Table 5.7: Medical facility components/themes and items assessed

Item No.	Facility structure and planning	Poor	Partial	Complete
1	Easy drive to/from	38 %	58 %	14 %
2	Mass transit system	21%	71%	8 %
3	Offer free transport service	96 %	-	4%
4	Access People With Disability	38 %	54 %	8 %
6	Parking safe & Light	63 %	37 %	-
7	Clean & Well maintained	29 %	40 %	29 %
8	Management of communicable diseases	25 %	71 %	4 %
9	Contingency plan	8 %	71 %	21 %
11	Access to medical service	25 %	67 %	8 %
12	Record keeping	8 %	84 %	8 %
13	Code of conduct	37%	63 %	-
14	Staff committed	29 %	71 %	-
15	General admission	29 %	63 %	8 %
16	No legal issues	50 %	46 %	4 %
18	Shower rooms	21%	71 %	8 %
17	Toilet audited and well light	16 %	84 %	-
19	Dustbins	67 %	29 %	4 %
20	Infection control	17 %	83 %	-
21	Airflow control	13 %	71 %	16 %
22	Washing & drying hands facility	21 %	71 %	8 %
No.	**Emergency care facility**	**Poor**	**Partial**	**Complete**
1	24 hour service	88 %	8 %	4 %
2	Treat & observe medical/surgical case	54 %	33 %	13 %
3	Primary Health Care (PHC) manual	38 %	50 %	13 %
4	Phone & intercom operation	13 %	58 %	29 %
5	Poison Manual	4 %	38 %	58 %
6	CPR/COMA poster displayed	13 %	25 %	63 %
7	Emergency trolley	46 %	46 %	8 %
8	Air materials	46 %	46 %	8 %
9	Bleeding equipment	79 %	21 %	-
10	Cardiac care	21 %	38 %	42 %
11	Splinting & POP	33 %	54 %	13 %
12	ENT service	33 %	29 %	38 %

Table 5.7. Medical facility components/themes and items assessed (continued)

Item no.	Specialists	Poor	Partial	Complete
1	**General Surgeon**	25%	25%	50%
2	Orthopaedic surgeon	58%	17%	25%
3	Optician	42%	21%	38%
4	ENT Surgeon	33%	38%	29%
5	Physiotherapist	42%	13%	46%
6	General doctor	4%	4%	92%
7	Neuro-surgeon	88%	8%	4%
8	Pharmacist	25%	25%	50%
9	Environmental officer	33%	42%	25%
10	Lab Expert	4%	-	96%
11	Social Worker	21%	21%	58%
12	Optometry	58%	21%	21%
11	Radiographer	25%	4%	71%
12	Dietician	71%	21%	8%
Item	**Rehabilitation**	**poor**	**Partial**	**Complete**
1	Health care team accredited	58%	33%	8%
2	Reconditioning	87%	13%	-
3	Occupational therapy	71%	21%	8%
4	Physiotherapist	50%	17%	33%
5	Climbing gym materials	67%	25%	8%
6	Equipment room audited	63%	29%	8%
7	Floor & Carpet clean audited	63%	29%	8%
8	Assistive device materials audited	63%	29%	8%
9	Fridge/U/S/Other	79%	13%	8%

Table 5.7. Medical facility components/themes and items assessed (Continued)

Item	Specialised departments	poor	Partial	Complete
1	Nutritionist	58%	38%	4%
2	Catering	58%	38%	4%
3	Nutritional guideline manual	67%	29%	4%
4	Research & training	46%	46%	8%
5	Gynaecology & obstetrics	25%	38%	38%
6	Surgical department	25%	42%	33%
7	Contact details of surgeons	13%	71%	16%
8	Resuscitation	4%	75%	21%
9	Theatre equipment	25%	54%	21%
10	Clinic support	13%	58%	29%
11	Local & international collaborations	4%	84%	12%
12	Neuro-clinic	83%	4%	13%
13	Mental health	29%	63%	8%
14	Temporary care seclusion	17%	63%	21%
15	Provide counselling	8%	54%	38%
16	Specialized staff	33%	50%	17%
17	Pharmacy & essential drugs	-	50%	50%
18	Pharmacy comply with local and international guidelines	-	54%	46%
19	Clear standards to manage drugs	4%	50%	46%
20	Secure store rooms	4%	54%	42%
22	Basic Ophthalmic	29%	29%	42%
23	Basic curative care	8%	46%	46%
24	Referral systems	8%	38%	54%
25	Radiological dept.	25%	54%	63%
26	MRI	92%	-	8%
27	CT-Scan	92%	-	8%
28	U/S Diagnostic	21%	4%	75%
29	Biochemistry	46%	33%	21%
30	Haematology	8%	25%	67%
31	Lung function tests	92%	8%	-
32	Microbiology	4%	17%	79%
34	Counselling clinic	4%	58%	38%
35	Oral health clinic	21%	38%	42%
36	Aseptic trolley	21%	33%	46%
37	Dental Autoclave	25%	38%	38%
38	Telephone contacts	13%	63%	25%
39	Best practice medical guidelines	29%	42%	29%

5.4.6 High-performance facilities

Table 5.8 shows the distribution of the ten high performance facilities associated with providing rehabilitation and re-conditioning services in Uganda.

Table 5 8: The distribution of high-performance facility centres

No.	Location	Number of HPC
1	City centre	6 (60%)
2	Up country	4 (40 %)
Total		**10 (100%)**

Table 5.9 shows the items under the nine components/themes contained in the observational checklist used to collect data about high performance centres in Uganda. The components/themes include: "facility location (external accessibility)", "facility maintenance and safety", "facility accessibility (internally)", "programmes or services offered", "physical training programmes", "educational and motivational programmes", "facility communication channels", "personal or individual services" and "variety and convenience".

Few high-performance centre facilities were "located" close to the sports facilities (13%). Furthermore, under the component of "maintenance and safety", none of the facilities had *automated external defibrillator* and *oxygen*. However, half of the facilities maintained better *space for classes* and *workouts, visible* and *easy to understand signs* of the facilities and services offered. Majority of the items under "maintenance and safety" were categorized as *poor* to *partial* standard (Table 5.9). The "access within" the facilities was assessed. None of the facilities had *power-door openers* and *elevators,* however, a few were accessible (12%) by *people with a wheel-chair.*

Under the component of "physical training", majority of the items were 75*% complete* based on the checklist scores. However, under the "educational and motivational" component, most of the items fell in the category of *poor* standards. Similarly, the "communication" and "special needs" component items the majority were categorized as *poor* standards.

Under the "personal services component", majority of the items fell in the category of *partial* to *complete* standards of the checklist. Similar results were established under the "variety and convenience" component items.

Table 5 9: The components/themes and items associated in High performance checklist

Item No.	Items/Variables			
A	**Location**	**Poor**	**Partial**	**Complete**
1	Easy drive to/from	25 %	62 %	13 %
2	Good mass transit	25 %	62 %	13 %
B	**Maintenance & Safety**			
1	Clean & Maintained	25 %	38 %	37 %
2	Space for classes & workout	25 %	25 %	50 %
3	Facility inside & out well lit	12 %	75 %	13 %
4	Non slippery floor	-	50 %	50 %
5	Signs visible & easy to understand	13 %	75 %	12 %
6	Hand rails throughout centre	87%	13 %	-
7	Automated External Defibrillator & oxygen	100 %	-	-
8	Admin aware of policies regarding health care in sports	50 %	50 %	-
9	Ventilation system adequate	25 %	50 %	25 %
C	**Accessibility**	**Poor**	**Partial**	**Complete**
1	Power-door Opener	100 %	-	-
2	Area accessible to W/C	13 %	75 %	12 %
3	Elevator available to all floors	100 %	-	-
H	**Programmes or Services offered**	**Poor**	**Partial**	**Complete**
1	Health & wellness	38 %	50 %	12 %
2	Functional fitness assess	38 %	50 %	12 %
3	Realistic goals	12 %	23 %	65 %
4	Create customized workout	12 %	13 %	75 %
G	**Physical training programmes**	**Poor**	**Partial**	**Complete**
1	Variety of training	-	25 %	75 %
2	Cardio	-	25 %	75 %
3	Strength	-	25 %	75 %
4	Flexibility	-	25 %	75 %
5	Balance	13 %	12 %	75 %
H	**Educational & Motivational**	**Poor**	**Partial**	**Complete**
1	Nutrition & Weight	37 %	38 %	25 %
2	Medical condition	75 %	25 %	-
3	Behavior management & modification	65 %	35 %	-
4	Pain management	37 %	25 %	38 %
5	Stress management	65 %	35 %	-
6	Mental acuity	75 %	25 %	-
7	Emotional health	88 %	12 %	-
I	**Communication**	**Poor**	**Partial**	**Complete**
1	News letter	100 %	-	-

Table 5.9. The High-performance checklist (continued**)**

2	**Website**	**75 %**	**12 %**	**13 %**
3	Bulletin	62 %	25 %	13 %
4	Newspaper & Magazines	-	-	8
5	Special events	75 %	12 %	13 %
J	**Personal services**	**Poor**	**Partial**	**Complete**
1	Free on going on assistance	12 %	50 %	38 %
2	Personal training	-	50 %	50 %
3	Doctor order rehabilitation	26 %	37 %	37 %
4	Massage	25 %	25 %	50 %
K	**Special needs**	**Poor**	**Partial**	**Complete**
1	Chronic & age related concerns	62 %	38 %	-
2	Class intensity levels	25 %	75 %	-
3	Work with physicians	62 %	38 %	-
L	**Variety & convenience**	**Poor**	**Partial**	**Complete**
1	Pool activity	75 %	-	25 %
2	Modern equipment	25 %	75 %	-
3	Clean equipment	13 %	62 %	25 %
4	Safe & working equipment	13 %	62 %	25 %
5	Enough machines	13 %	62 %	25 %
6	Workout & personal space clean	13 %	62 %	25 %
7	Accessibility	-	62 %	38 %
8	Strengthen machine	-	50 %	50 %
9	Flexibility machine	12 %	38 %	50 %
10	Balance machine	12 %	38 %	50 %
11	Exercise lab	12 %	38 %	50 %
12	Open floor	13 %	62 %	25 %
13	Class room with chairs/table	38 %	38 %	24 %
14	Shower & lockers	24 %	38 %	38 %

Table 5.9. The High-performance checklist (continued)

15	Filtered water	24 %	38 %	38 %
16	Equipment friendly	12 %	50 %	38 %
L	**Variety & Convenience**	**Poor**	**Partial**	**Complete**
18	Cardio display panel	12 %	50 %	38 %
19	Emergency lean and belt	25 %	25 %	50 %
20	Instructions with diagram	25 %	25 %	50 %
21	Range of motion adjustable	12 %	38 %	50 %
22	Ability to change resistance	12 %	38 %	50 %
23	Code of conduct	13 %	87 %	-
24	Staff ratio to clients	25 %	75 %	-
25	Identify staff	38 %	50 %	12 %
26	Staff equipped with fatigue symptoms	38 %	62 %	-
27	File of record of training with dates and next updates on staff-Basic Life Support training	87 %	13 %	-
28	Staff & medication training	75 %	25 %	-
29	Facility has medical experts	75 %	25 %	-
30	Good reputation	-	50 %	50 %
31	International & local fitness associated	50 %	50 %	-
32	Obey country laws	38 %	38 %	24 %

5.5 SUMMARY OF THE RESULTS ON SPORTS, AND MEDICAL FACILITY

The majority of the sports facilities for (athletics (86%); football (67%) and rugby (67%) were located up country. Most of the basketball sport facilities (60%) were within the city centre (Table 5.1).

The “facility management” themes/components in all the four federations (UAF, FUBA, FUFA and URU) were in poor state category (Table 5.10 marked RED). The Uganda Athletic Federation (UAF) and Uganda Rugby Union (URU) “facility structures and planning” were all categorised as being in a poor state (marked RED). However, the Federation of Uganda Basketball Associations (FUBA) and Federation of Uganda Football Associations were in a partial standard state under “facility structure and planning” component (marked Yellow). Similarly, the “hygiene components/themes” for UAF and URU federations were categorized as being in a *poor* state compared to FUBA and FUFA, which were in *partial* standard state category (Yellow). The majority of the federations’ stadium health care facility components/themes were in a poor state, except the UAF which was categorized as being in a partial state compared to the standard.

Table 5.10: Summary of the state of overall components/themes associated with sports facilities assessed

	Sports federations			
Facility components/themes	**UAF**	**FUBA**	**FUFA**	**URU**
Facility management				
Facility structure and planning				
Facility hygiene				
Facility stadium health care				

Red = *poor*
Yellow = *partial*
Green = *complete* (adequate level)

The majority of the medical facilities (70%) used by athletes in Uganda were located up country (Table 5.6). However, this was not the case with high performance centres where the majority of which were in the city centre (60%) (Table 5.8).

Most of the medical facilities used by athletes, the "facility structures and planning", "the emergency health care services", "specialist services" and "specialized departments" components/themes were found to be in *a partial* state (Table 5.11 marked Yellow). This compares to the "rehabilitation" department components/themes which were in a *poor* state in most of the facilities studied.

Table 5.11: A summary of the state of overall components/themes associated with medical facilities assessed

Components/themes	**Poor**	**Partial**	**Complete**
Facility structures and planning			
Emergency health care services			
Specialist services			
Rehabilitation department			
Specialized health care department			

In case of the high-performance centres, "facility maintenance and safety", "facility accessibility", "educational and motivational programmes", and the "facility communication systems" were in *poor* state (Table 5.12). In case of "facility locations", "programmes and services offered", and "special needs care plans" were in a *partial* state (Table 5.12). The

physical training programmes components/themes of most the high-performance facilities studied in Uganda were in a state of adequate/complete standard (Table 5.12)

Table 5.12: A summary of the state of overall components/themes associated with the high performance facilities assessed

Components/themes	Poor	Partial	Complete
Facility location			
Facility maintenance and safety			
Facility accessibility			
Facility programmes and services			
Facility physical training programmes			
Facilities educational and motivational programmes			
Facilities Communication systems			
Facilities special needs care plans			

5.5 DISCUSSION

This study assessed the state of Uganda‘s facilities (sports, medical and high performance) and practices associated with health and safety for the athletes. The sports organisations (international and local clubs), and national governments have a duty of care for the health and safety of their athletes at all levels of sports participation (Sepehri & Sheikhalizadeh, 2017; Swan et al., 2007). Globally the facilites for sports, and health care services are under public scrutiny for injuries and illness to their beneficiary (Dorje et al., 2014; Leeper et al., 2017; Orchard et al., 2005; Sepehri & Sheikhalizadeh, 2017; Takemura et al., 2007). The health and safety guidelines are available from the international sports and health organisations (Finch & McGrath, 1997).

5.5.1. Under the structure, services and equipment themes

Management

At the time of this study, there was a lack of compliance with sports facility management guidelines for the majority of sports codes as per requirements of the international sports organisations (Swan et al., 2007; Sepehri & Sheikhalizadeh, 2017). The best practice guidelines require sports facilities to have: a contingency plan, emergency care

services plan, and communication. In the majority of sports facilities there was no contingency plan (Table 5.2). For example, 95% of facilities in athletics, 75% of facilities in basketball, 75% of facilites in football, and 78% of facilites in rugby had a poor rating for having a contingency plan. The same results were established with the items associated with the emergency and communication components/themes.

The international sports bodies and other sports institutions maintain that to demonstrate adequate and appropriate facility contingency plan, the following items must be visible, and in practice. For example, the building and site maps, floor plans, escape routes, emergency equipment inventories, emergency procedures and personal contacts should displayed (IAAF Manual, 2008; Guskiewicz & Broglio, 2015; IAAF sports facility manual, 2013; Popp, Berry, & Judge, 2018; FIFA stadium manual, 2010). In addition, the sports medicine physician in charge of the sports facility should make sure that the sudden cardiac arrests, weather, heat strokes, spinal cord damages or head injuries are part of the facility plans (Guskiewicz & Broglio, 2015). The results show inconsistences and inadequacies of the above items in practices as per recommendation (Table 5.2-5.5).

In the developed countries, complying with facility best practice rules and regulation has shown to reduce costs in sports. For example, Swan et al (2007) investigated the standards and benefits of implementing best practice principles (application of checklists to monitor sport facility safety policy-guideline) for sports facilities. They showed that the sports federations/codes, and clubs that complained 100% to the best practice's principles for facility safety, also demonstrated a reduction in insurance claims. Also, appropriate and adequate emergency care services are associated with better response to medical problems, necessary for optimistic outcomes (Popp, Berry, & Judge, 2018). Therefore, an emergency plan at sport venues is a vital item under the component/theme facility management (Sepehri & Sheikhalizadeh, 2017).

The literature has shown evidence that the level of compliance to recommended standard might not be exactly same. Many clubs in developed countries still struggle to comply with international facility regulations for health and safety (Dorje et al., 2014; Aleman & Meyers, 2010; Gholami, Mehdipour & Azmsha, 2012). For example, the quality of medical services, equipment and policies were studied in rugby union clubs in the Republic of Ireland, on (Coughlan, Fullen & McCarthy, 2013). The study showed that only the 30% of clubs had a medical policy, and 50% had health and safety policies. The lack of

proper communication and rehearsing of the facility health and safety guidelines with the stakeholders has been mentioned as a reason for the low compliance (Haralabos Stamatakis et al., 2003; Moyle, Kennelly, & Lamont, 2014). Therefore, this suggests that International sports bodies and WHO should continue to support the national institutions to assist in the training and continued evaluation of the sports resource providers' services at the club level. The improvement of the sports facility management organisation and structures that are in place may further support injury prevention and management strategies, and therefore improved athlete's performance.

Hygiene and sanitation

The overall hygiene, and the sanitation situations in all the sporting code was below the required standards as stipulated by the international sports bodies. In fact, on average, the toilet facilities for athletics (60%), basketball (58), football (60%) and rugby (56%) were poorly rated. Theere were 78% of the shower facilities from rugby sports facilities that were rated poor on average. The guidelines are that each sports facility should have apropper toilet facility (Swan et al., 2009). The lack of will to comply with best sports facility practice principles, highly predisposes athletes to disease and injury (Orchard et al., 2005; Takemura et al., 2007).

Sports facility medical services

The results have shown that the overall facility medical services were below the standard set by the WHO, and International sports body' for health and safety of the facilities (Farsi et al., 2006; Farsi et al., 2012). None of the sports facilities was found keeping injury and illness records. In addition, none had a training programme for basic life support or even Automated External Defibrator (AED) equipment, and a doping station control unit. The delayed attentions is been associated with poor health care outcome of the injured athlete (Casa et al., 2012; Courson et al., 2014). For the athlete to have the best possible outcome, competent and immediate care is critical (Popp, Berry, & Judge, 2018).

A similar state of health facilities at the sports environments have been reported in other countries. For example, the study of rugby union clubs in the Republic of Ireland, showed that 66% had quality standard medical rooms (Coughlan, Fullen & McCarthy, 2014). Also, only 20% of the clubs had an anti-doping office, 54% had a physiotherapist, 55% had a doctor (55%) and 80% had a first aider. About 27% of clubs had a policy on injury

surveillance, and 18% had a policy on infection control. The medical equipment that were common to all medical rooms were stretchers, scoop board, spinal board, first aid kit and AED.

5.5.2 Medical facilities

The health care facility infrastructure is a major component of a health care system. For instance, the WHO Alliance for Health Policy and Systems Research defines six building blocks of health care systems, the infrastructure constituting one component of the building block "service delivery" (Savigny & Adam, 2009).

a. Medical centres structuring and planning (Table 5.7)

The findings of the current study showed that most (70%) of the medical facilities that treated injured athletes were located in the up country regions. Similarly, Olsen (1996) investigated the availability, and the services at sports medical facilities across the United States of America. The author revealed that the majority (34%) of sports medicine centres were in the sub-urban as compared to urban (26%). This implies that when decisions are made to equip national medical facilities, the location should not bias thedecision. In addition, the cost of support staff might affordable making the service quicker and cheaper as compared to urban areas where the competition might be higher.

The findings on the medical centres facilities in Uganda that manage athletes, showed that majority of the components/themes of these centres were rated as of partial standards (Table 5.7). It is a requirement that hospital emergency departments should be open 24 hours. Also, the contingency plans and the procedures for controlling infections should be displayed. Further, the staff commitment statement should be displayed. The results of the current study, the 71% of medical facilities did not display of contingency plan, 71% did not have staff commitment, 71% did not have measures to control of communicable diseases, and 50% had legal challenges (50%). Similarly, 67% of the centres did not have dustbin, and 96% of medical centres did not have free transport services items to the sick.

b. Medical centre's emergency department services (Table 5.8)

Majority of the emergency departments care services were rated poor. In fact, 84% of the medical centres were not operating the complete emergency department services for 24 hours. A previous study about medical facilities in Uganda had similar concerns (Musinguzi

et al., 2015). This study investigated about the capacity of health facilities in Uganda to manage hypertension. Although the study concentrated on mainly diabetes, and high blood pressure, the findings showed that health facilities in Uganda were still inadequately equipped to provide emergency medical services to the communities (Musinguzi et al., 2015). The authors further recommended training of personnel in the management of hypertension, and other chronic diseases, and improving treatment equipment supplies.

c. Medical centre specialist staffs (Table 5.8)

The results of this study have shown that majority of the medical centres' specialists' components/themes did not comply with the standard rules and regulations. The medical centres were understaffed in areas of a neuro-specialists (4%), dietician (8%), orthopaedic surgeon (25%), optometry (25%) and physiotherapy (46%). However, specialists such as lab staff were available to 96% of the centres, radiographers to 71% of the centres and social workers to 58% of the centres. There is no a certification board for the discipline of sports medicine in Uganda, so it was not possible to check the quality of these services.

d. Medical centre rehabilitation services

In the overall rehabilitation components/themes, the items were rated *poor* (Table 5.7). This can either be attributed to the lack of awareness among athletes on appropriate and adequate strategies for injury prevention and management in Uganda. Another reason may due in adequately equipped facilities to care about sports related injuries.

e. Medical centre specialised department (Table 5.7)

The majority of the medical centres items investigated were rated to be in partially standard for various specialised departments. As previously mentioned, the lack of enough specialists, is an indicator of poor quality of the facility in terms of service given. There is a critical need by the government and private sector to address this problem.

5.5.3 High-performance centre facilities (HPCF)

This study showed that the exercises or physical medical services (training variety, cardio, strength, flexibility and balance) offered at the selected high-performance centre facilities in Uganda are comprehensive (Table 5.9). This in contrast with Olsen (1996) who

reported that 93% of the USA medical facilities had more medical rehabilitation services as compared to exercise and conditioning programmes. However, the majority of the high-performance centre facility components/themes (Table 5.7) were rated poor as per checklist standards. The variables under the component/themes: accessibility, educational and motivational programme, the special need clients, maintenance and safety were significantly below the recommended international and checklist standards.

5.6 THE OVERALL SUMMARY AND CONCLUSION OF STUDY THREE

This is the first study to explore and examine the state of the sports facilities in Uganda.

Most of the medical facilities across the country where athletes go for the medical services demonstrated several weaknesses in terms of equipment, services and staffing. The facilities did not have the items that are contained in the contingency planning, emergency care and communication according to the principles of the international sporting organization. The hygiene and sanitation needed improvement in all the sports facilities. The standard of the change rooms for athletes in all the facilities were rated *poor* to *partial*, therefore a high risk of infection may be expected. None of the sports facilities had medical rooms to manage or screen athletes for previous injuries and illness, including doping monitoring station. The findings suggest an urgent need to improve the standard of national sports facilities, especially the health and safety units. This indicated a poor compliance to international sports health and safety guidelines. For example, the emergency departments, were not fully functional for 24 hour. The study also showed understaffing of neuro-specialists, dietitians, orthopedic surgeons and physiotherapists. In terms of high-performance centres, there is a need to create awareness to the general public about these services. There is also a need to improve on the knowledge among the staff providing care to athletes. The athletes also need to be informed about the functions and role of a high-performance centre. The study has further showed that there is a need for sports medicine board to certify the health service providers who are interested in providing services to athletes. This will save athletes from unwanted outcomes and financial burdens due to poor services.

Further, the analysis of results showed that most athletics clubs or participants were found in rural areas. This implies that rural medical facilities are more likely to receive more athletes for medical consultation or attention compared to medical centres in urban areas.

Therefore, the government may need to equip the rural medical facilities in a similar way compared to those in urban areas.

In conclusion, there is a need to create awareness, and improve on the knowledge among the staff providing health care to athletes. Athletes need more information on the functions and role of a high-performance centre. There is a need to set-up a sports medicine board to certify the health service providers who are interested or provide services to athletes. Also, a legal frame-works (laws) to protect any individual participating in recreational, amateur or competitive sports should be established. Further research should be conducted to assess the cause of poor medical and medical facilities in the country. There is also a need to assess the available policies that protect and maintain sports and medical facilities in Uganda.

CHAPTER 6

AN ASSESSMENT OF THE NATIONAL SPORTS HEALTH CARE POLICIES AND GUIDELINES IN UGANDA

6.1 INTRODUCTION AND BACKGROUND

The national sports policy creates a favorable environment for sports participation, and athletes' well-being (Swan et al., 2009). These authors mentioned that the sports vision for a country is also shared with the sports authorities and public, including the actions on the transformation of sports activities based on the new rules and regulations. The sports policies may easily link with many government sectors. For example, the Department of Transport, and the Department of Health may get involved in the development of the national physical activity plan. The national sports policy also ensures that athletes use quality facilities for sports activities and health care (Swan et al., 2009; Finch & McGrath, 1997). The same authors' further point out that monitoring sports activities, may identify areas where capacity building is required in sports. The national sports policy should enable all sports activities of the country, including those that target health promotion as compared to private organisations

Several countries have developed and implemented national sports policies (National Sports Policy 2018 – 2027, 2019; National Sports and Recreational Plan 2012-2030, 2019; Sports Policy Nigeria, 2009). These policy documents mainly focus on increased participation in sports. This is demonstrated through phrases such as *every citizen should engage regularly in some form of sport and physical activity*. This includes people with physical disabilities. The Australian sports policy is more proactive with priority areas of building more active Australians, achieving sporting excellence, safeguarding the integrity of sports and strengthening Australia's sports industry (Booth, 1995b).

For decades, researchers have criticised the international and national sporting organisations for not playing an active role in protecting the health and safety of athletes (Finch & McGrath, 1997; Swan et al., 2009). Now, the international sporting bodies are shifting attention to the health of athletes (Mountjoy & Junge, 2013; McCrory et al., 2017) and are ensuring that member countries develop and enact laws that will facilitate best practices in sports.

In the field of sports medicine, studies assessing the development and evaluation of the national sports health care policies are rare. Reports from developed countries have been used for developing countries. However, the needs of developing countries may be different and therefore the reports from the developed countries may be inappropriate for the developing countries. Therefore the purpose of this study was to further establish if there was a national sports health care policy document to mandate health services delivery to the athletes in Uganda. In particular this study sought to address the following;

(i) Stakeholder's knowledge about the athlete's well-being,
(ii) Stakeholder's knowledge about best medical care in sports,
(iii) Availability of a national sports health care policy document guidelines, and
(iv) Committees or human resources developing the guidelines.

6.2 METHODS

6.2.1 Research design

A qualitative research method and an exploratory design were used in this study. This approach was chosen because we sought information regarding institutional, organizational and federation details of guidelines (rules and regulations) that have not been written about before. The specific objectives include: (a) the sports resource providers' knowledge about athlete's well-being, (b) sports resource providers' knowledge about best medical care practices in sports, (c) availability of a national sports health care policy and, (d) the Human resource structure responsible for making the sports health care policy guidelines. The research team used phrases like; "*what*", "*how*", "d*o you*", "*in your opinion*".

A. The credibility of the methods and design

I. Trustworthiness

Qualitative studies are sometimes described as being none representative. To ensure credibility of this research, the researcher purposefully recruited participants from only the sectors that are mandated to carry out sport development in the country. Additionally, the whole process of coding to identifying emerging themes adds to dependability of the data presented (Tong, Sainsbury, & Craig, 2007). More than one method of inquiry i.e. semi structured interview, and review of documents was used to collect data about each objective

(Tong, Sainsbury & Craig, 2007). Enough time was arranged with the interviewees for detailed interview and document reviews. The use of tape recorder, iPad video recorder and cell phone, enabled the researcher to become more interactive, observing and attentive to events and emotions during the interview, and also ensured that the interviewee was accurately described (Bowling, 2002).

The researcher worked with the research assistant at each level of data collection until after the analysis. This approach added transparency value to collected data (Tong et al., 2007). Two private independent individuals, who were experienced in transcribing audio recordings were hired to transcribe the interviews. Additionally, all the transcribed information from interviews was emailed to the interviewees for approval and/or correction of the material. The project supervisor received feedback of data collection and analysis at least twice a week. The results had to be agreed upon by more than two parties (researcher, interviewee, and independent transcribers). The interviewees had an opportunity to affirm the information that was gathered after every interview. This was done to address the issues of dependability, validity and confirm-ability during qualitative research (Tong et al., 2007).

II. Ensuring triangulation of data

For the sake of triangulation in qualitative data analysis, the preliminary data transcription and analysis involved both the researcher and the two independent individuals who had experience in qualitative data analysis. Transcription was done by independent individuals, then proofread by the researcher and supervisor of the project. Furthermore, each participant was given a post interview summary of findings for approval immediately after the interview. The processes of generating pre-determined themes were developed by the researcher during the preparation of the project proposal. This strategy of collecting, analysing and reporting the data ensured trustworthiness of the information reported in this study (Tong et al., 2007).

6.2.2 Research setting

The study was conducted in Uganda (see Chapter One for description of Uganda), with the government division for non-communicable disease in the Ministry of Health (MoH), and Ministry of Education, and Sports (MoE/S), Department of Physical Education and sports (PE/S). Two other local organizations also participated in the study; the National Council for Sports, and the Uganda Olympic Committee. In addition, the four major sports

federations (Federation of Uganda Football Association (FUFA), Uganda Athletics Federation (UAF), Uganda Rugby Union (URU), and the Federation of Uganda Basketball Association (FUBA)) in Uganda participated in the study. These federations were described in Chapter Three.

The Ministry of Health has the mandate of policy formulation and policy dialogue. The ministry regulates, advises other ministries on health matters, set standards and assures quality services in the country. Besides, it also carries out capacity development and technical support; provision of nationally coordinated services such as epidemic control; coordination of health research and monitoring of health care programmes. This is done with the collaboration of Health Development Partners (MoH, 2019).

The Department of Physical Education and Sports (PE/S) is within the Ministry of Education, and Sports (MoE/S), and has a full minister (Minister of State for Sports). The department is responsible for sport and policy development in the country. This is done through liaising with the National Council of Sports (NCS) on issues regarding National Sports Federations/Associations and Uganda Olympic Committee. The department also provides sports equipment, instructional materials and facilities for talent identification and development at educational institutional levels (http://www.education.go.ug/physical-education-sports/). The National Council of Sports (NCS) is also within the Department of Physical Education and Sports. This is a statutory organ which was established following the 1964 Act of Parliament (https://www.ncs.go.ug/content/mandate). The NCS develops, promotes and control sports activities in Uganda on behalf of government, under the MoE/S. The council also plans general policy of sports promotion and stimulates interest in sports at all levels among other things. There are currently over 48 federations and associations affiliated to the NCS (http://ncs.ug/sports-associations/).

The Uganda Olympic Committee (UOC) was started in 1950 and became affiliated to International Olympic Committee in 1956. Its current role is to provide a platform which top level athletes use to prepare for the Olympic and Commonwealth Games. There are over 13 federations and associations affiliated to the UOC body. The sports federations in Uganda are national governing bodies for the respective sporting codes. They do this work under the rules and regulation of the regional and international sporting bodies to which they belong. The research data were collected from only four of federation affiliated to the UOC body (FUFA, FUBA, UAF and URU).

6.2.3 Population and the sampling

The population sample (sports resource providers) was obtained from the Ministry of Health (MoH), Ministry of Education, and Sports, National Council for Sports, and Uganda Olympic committee. Furthermore, participants were recruited from the FUFA, UAF, URU, and FUBA.

Participants from the MoH included the Minister of State for Health, the permanent secretary MoH who in charge of general duties, and the commissioner for non-communicable diseases MoH (Table 6.1 below). Participants from the MoE/S included the Minister of State for Sports, permanent secretary for the MoE/S, and the assistant commissioner in the department of physical education and sports. The researcher further invited the president of the Uganda Olympic Committee, and the secretary general National Council for Sports to participate in the interviews. Participants from national sports federations (FUFA, UAF, FUBA and URU) included; the executive officers (secretary general for each federation), the heads medical team, the head of male coaches for the federation, and head female coaches for the federation (Table 6.1 below). The number and the members from each ministry, institution and organization are presented in the Table 6.1 below.

Table 6.1: Distribution of sport resource providers (interviewee) for the study

No.	Institution	Category of the participants	No. of Participants
1	**MoH**	Minister	1
		Permanent Secretary	1
		Commissioner Non-Communicable Diseases	1
2	**MoE/S**	Minister	1
		Permanent Secretary	1
		Commissioner for Physical Education & Sports	1
3	**NCS**	General Secretary	1
4	**UOC**	President	1
5	**UAF**	Secretary General	1
		Head medical team	1
		Coach male national team	1
		Coach national female team	1
6	**FUBA**	Secretary General	1
		Head medical team	1
		Coach national male team	1
		Coach national female team	1
7	**FUFA**	Chief Executive Officer	1
		Head Technical programmes	1
		Head medical team	1
		Coach national male team	1
		Coach national female team	1
8	**URU**	Chief Executive Officer	1
		Head medical team	1
		Coach national male team	1
		Coach national female team	1
		Total	24

MoH: Ministry of Health; MoE/S: Ministry of Education, Science, Technology and Sports; NCS: National council for Sports; UOC: Uganda Olympic Committee; UAF: Uganda Athletic Federation; FUBA: Federation of Uganda Basketball Associations; FUFA: Federation of Uganda Football Associations; URU: Uganda Rugby Union.

The researcher used selective and purposive sampling to recruit the participants for the interview. This method depends on personal judgment for prior determination of typical characteristics of the participants required to fulfil a particular study need (Kruger, 2003; Bowling, 2002). Another reason for selective and purposeful sampling technique was the

conceptual framework guiding the study project (Figure 2.2). The framework clearly indicates the role of sports resource providers in policy development.

The data in qualitative study is often regarded as lacking generalization of the population of interest. However, in this case the researcher chose from persons who are in charge of policy planning and formulation, policy implementation and monitoring. Sports policy development was part of their major responsibilities. In addition, 70% of this sample had vast experience in sports of between 5-30 years (Table 6.2).

6.2.4 Procedure of information gathering

Groundwork

A. **Ethics issues**

The University of Cape Town provided the ethical clearance for the study (Appendix 9). Additional ethical clearance was obtained from School of Public Health Makerere University (Appendix 10-12) and the National Council for Science and Technology in Uganda (Appendix 13). This was in accordance with the Uganda National Research Guideline; which describes that "a research protocol involving humans developed outside Uganda undergoes National Academic Institutional Review within the country before registered and cleared by the Uganda National Council for Science and Technology". There was another a verbal clearance from the president's office based in Kampala. This happened after we wrote a letter to this office and had a meeting with the person in charge of research (Appendix 14). Finally, permissions to conduct research study were also obtained from the four federations in charge of the football, basketball, rugby and athletics (Appendix 15-19).

B. Interview guide piloting

The semi structured interview guide was piloted at Makerere University, Department of Sports Science (n=2 lecturers). The relevance and clarity of the questions were evaluated. The two lecturers agreed that the questions were relevant to the topic and could answer the intended objectives.

However, they advised to change the tone of the some of the questions. For example, they recommended to start the interview with *what,* and *how* rather than *why* questions. The corrections were made; executed practices of the interview guide again until all the parties

were satisfied. The interview guide was not translated because English is the official language of the participants.

The interview guide had two sections; section A started with the demographic questions such as interviewee age, date of birth, work experience, role in the institution/sports federations and previous sports engagements/experience. Section B consisted of questions such as: (a) what the interviewee understood by the term well-being of an athlete and (b) knowledge and perception about best medical care practices in sports, (c) if the interviewee had knowledge of or had a national sports health care policy document, and (d) lastly the Human resource structure helping the development of the sports health policy-guidelines.

C. Data collection process

The study utilized purely qualitative methods. This involved the use of a semi-structured interview guide and document content analysis. The content analysis was to be carried out on Ministry of Education and Sport policy documents. The semi-structured interview guide was used during face-to-face information gathering with interviewees.

D. Interviews with the sports resource providers (interviewees)

Twenty-four interviewees accepted to participate in the study (Table 6.2), the interviews were conducted at the interviewees' place of choice. For this reason, they were relaxed during the interview process. The demographic information of the participants will be narrated in accordance with the fact that qualitative research uses non-quantitative methods (Tong et al., 2007)

Table 6.2: Demographics of the participants (Table of informants)

Institution	Age(years)	Qualification/Professional & the number (24)	Experience (years)
Ministry of Health (MOH)	45-55	Medical Doctor (n=1)	3-7
	45-55	Professor & Medical doctor (n=2)	3-7
	45-55	Medical Doctor (n=2)	3-7
MOE/S	50-65	Engineer (n=1)	15-20
	60-70	Educator & teacher (n=2)	15-25
	40-45	Teacher & Diploma in Sports management (n=3)	5-8
National Council of Sports	40-50	Masters in Sports Science (n=1)	5-10
Uganda Olympics Committee	35-45	Computer science & Olympian (n=1)	2-5
FUFA	30-40	Former Elite player (n=1)	10-15
	40-60	FIFA Trained coach (n=2)	15-20
	45-55	FIFA Trained coach (n=3)	10-15
	40-50	Doctor & Certificate in sports medicine (n=4)	5-10
FUBA	35-45	Lawyer (n=1)	1-5
	30-40	Graduate (n=2)	1-5
	30-40	Social worker & Elite player (n=3)	1-5
	30-40	Nurse & Certificate in Sports Medicine (n=4)	1-5
UAF	40-40	Social worker & Former Olympian (n=1)	10-15
	45-55	Teacher & Diploma in Sports management (n=2)	5-10
	45-55	Teacher & Former Olympian (n=3)	5-10
	25-35	Physiotherapist & sports medicine certificate (n=4)	1-5
URU	35-45	Engineer, elite player & Senior referrer (n=1)	1-5
	25-35	Medical Doctor & Emergency medicine expert (n=2)	1-5
	30-40	Engineer & Certificate in rugby coaching (n=3)	5-10
	30-40	Engineer & Diploma rugby coaching (n=4)	1-5

MOH= Ministry of Health; **MOE/S**= Ministry of Education, & Sports; **FUBA**= Federation of Uganda Basketball Associations; **FUFA**= Federation of Uganda Football Associations; **UAF**= Uganda Athletics Federation): **URU**= Uganda Rugby Union

The appointments were made 6-24 working hours after they received the research study details and a consent form requesting the respective authorities to avail time for the interview. The interview started with a brief demographic information in section A. Then moved to section B of the guide which had items concerning policies and human resource structures. Minor interruptions were accepted during the process especially with the ministers and executive offices of the federations. Using the prepared interview guide (Appendix 8), the one-on-one interview aimed to explore sports resource providers' perceptions and understanding of the well-being of athletes, and best medical care practice in elite sports. The questions were open ended, starting from simple to the most complex, from broad to specific. Each interview took an average of 8-20 minutes per participant. *The interviews were carried out in ordinary conversation between the interviewer and the interviewee.* This was in accordance with the preferred methodology for qualitative research (Tonga et al., 2007; Gill et al., 2008). The data collection period took two months, from July 2015 to September 2015.

E. Policy document analysis

At the conceptual stage of the study project, the main goal was to identify barriers to the implementation of the international sports health care policies in Uganda. Specifically, the researcher checked the government and sports institutions to establish the availability of the sports health care policy document. This is a document which is supposed to have guidelines for promoting and supporting the athlete's well-being. A hard copy of the national sport policy was not available when we visited the Ministry of Education and Sports. At a later stage, a soft copy was sent to me via the email. I used the interview questions to analyse the available document.

The other document of interest was of the committees responsible for drafting health care policies. Unfortunately, the document was not available for the research team on the day of the interview.

6.2.5 Data analysis

There are several methods of handling qualitative data including ATLAS, ti & NVivo (Friese, Soratto, & Pires, 2018; Leech & Onwuegbuzie, 2011). These software methods are suited for large datasets enable annotating and retrieving texts, locating words, phrases and segments of the data, preparing diagrams and extracting quotes. The practical analysis was

done by the researcher (Burnard et al, 2008). In the current study the researcher opted for the coding by hand method because of the small number of participants, and the interviews only lasted between 8-20 minutes, depending on how quick the participant responded to the questions.

After the interviews were concluded, two independent individuals, who were selected based on their experience in the transcription of qualitative interviews were hired to transcribe the data. The verbatim transcription was re-checked by the principle investigator, and the supervisor of the project for missed words, added, spelling and misuse of medical and scientific terms. Then the transcribed verbatim was sent to each participant by email, followed by a phone call to request they provide feedback to the research team. All the participants agreed the transcribed verbatim was a reflection of their contribution on the topic.

A. Coding

After familiarizing with the transcripts through several times of reading, the transcribed data sheets were given codes (P1...P5...P20...P23, P24) for anonymity (Miles & Huberman, 1994). The main research questions were entered into the excel spreadsheet and all answers contributed by the interviewee were copied and pasted under each of the four questions below respectively in the excel spreadsheet. Each of the four questions in the excel sheet was highlighted using a specific color. This was to make sure that coding from each participant was carefully managed or organised or kept together for each of later analysis. The results were further analyzed using a content thematic analysis method. There are two approaches for this method of qualitative data analysis; the inductive and deductive. I opted for the deductive approach, which identify items from the interview scripts based on the conceptualized theme (pre-determined themes such as; well-being, best medical care practices, national policy document about health care in sports and human resource experts for sports health care development).

The next stage in the coding process was to identify words, statements, concepts and phrases which were in agreement with the conceptualized theme under each question. These items were summarized and listed as codes from each participant under the corresponding interview question. Each of these items were again read several times, and later re-grouped according to the similarity for each word or phrase to form several categories. The categories were used to develop the sub-themes for each interview question. The sub-themes that

emerge from the analysis of transcripts illustrate the knowledge and insight of the sports resource providers about the conceptualized theme. The results of the findings are presented in the next section.

6.2.6 Ethical consideration

This study was conducted after obtaining ethical clearance from The University of Cape Town, School of Public Health Makerere University, National Council for Science and Technology, and permission from the government of Uganda President's Officer, and all the four federations.

The aim of the study was clearly explained to the participants (verbally and by information sheet) and informed consent was signed on the day of the interview after a brief discussion. All information and documents about the study were not translated, since the official language was English for all the participants. The researcher assured the participants that the information obtained from them was going to be confidential. The recorded tapes and the written materials were locked away from other people, and password protected. The participants were also told that their names, surnames and address were to be anonnymise in any report.The participants were informed of their right to either participate, or not, in the study as well as their right to withdraw at any time. In case of physical and/or psychological trauma (beyond researcher's ability to handle) in the process of the study, the researcher was prepared to act by referring to the appropriate disciplines. However, this plan was not needed as there were no of such emergencies.

6.3 RESULTS

6.3.1 Introduction

This section reports on results of the qualitative data findings gathered using a semi-structured interview guide and document content analysis. The four theory concepts that were tested are:

(i) Knowledge about the athlete's well-being,
(ii) Knowledge about best medical care in sports,
(iii) Availability of a national sports health care policy document guidelines and
(iv) Committees or human resources developing the guidelines.

The social demographic characteristics of the participants are presented in the Table 6.2 above. The deductive content analysis of the 24 interviews from the 24 interviewees yielded nine sub-themes under the concepts of athletes' well-being (main theme). There were five sub-themes that were produced from the theme "best medical care practice". One sub-theme was generated under a National Sports Health Care Policy document theme. The last question was about the available human resource capital for the policies and guidelines development in sports in Uganda. There were two important findings under this theme. These are presented below in a single narrative.

The sub-themes that emerged from the qualitative analysis of results are discussed below where appropriate supporting quotations are provided and indented. The names of the participants are changed to a letter P and number (maintained the codes) for anonymity.

6.3.2 The athlete's well-being theme

The assessment of the knowledge and understanding of the term athlete's well-being yielded the following themes shown in the Table 6.3 below. The detailed description of these themes are given after the Table 6.3.

Table 6.3: Sub-themes on how athlete's well-being was described by the participants

No.	Sub-themes	Frequency
1	Health, medical care and recovery of an athlete	14
2	Good coaching	10
3	Psychosocial and mental support	8
4	Financial support	4
5	Education, knowledge of equipment and good facilities	4
6	Nutrition	3
7	Performance	1
8	No Doping	1
9	Empowerment	1

A. Health, medical care and recovery of an athlete sub-theme

When the participants were asked their understanding and perceptions about the term *athlete's well-being,* the majority of the interviewees mentioned things to do with the *health of an athlete*. Participants argued that athletes should have proper and adequate medical care. Interviewees stressed that the athlete should be looked after before, during and after any sports participation programme. This includes proper access to sports health specialists and

the services they provide. In this situation, an athlete can be fit to participate in any sports event since is under the care of knowledgeable people. This quality of care is needed to promote and support athlete well-being in the country:

> … It would involve looking at the player before, during and after tournaments. How you manage his body before, during and after training **[P24]**

> … have a proper trained medical person at every training session……have every player on medical insurance because we have medical care on the pitch but if you sustain a sprain you may need to go for rehabilitation, that's where the Ugandan game is short **[P23]**

> …. have access to a physiotherapist because time and again, because of excessive training, they have problems with muscles and bones, athletes they need somebody to collect it, to do it, maybe the coaches may not have the ability to do it**. [P17]**

> …should be medically fit to play football and should have proper medical treatment, proper recovery after sustaining injuries while playing. **[P12]**

> …would also want to be in full state of health in order to perform… **[P17]**

The comments support the conclusion that the interviewees perceived medical issues to be part of athlete's well-being. In the next sub-theme, interviewees mentioned about coaching as another component under athlete's well-being.

B. Good coaching sub-theme

Several interviewees believed that adequate and appropriate training is part of athlete's *well-being*. Good coaches provide information on rest and load volumes that are required for the body to perform at optimum levels. Better preparation of athletes through informed guidance is an attribute of a good coach.

> …we have support services for athletes that are having coaches around for them…elite athletes having managers to guide athletes besides their talents in athletics… **[P21]**

> …before even they go for games, the most important is preparation, if you do not prepare well you cannot perform... **[P8]**

> …and the last one might be proper guidance in terms of technical aspect **[P7]**

> ...we need to tell them how much rest they need and how much skill level they need to attain… **[P20]**

> Normally people consider the athletes performance and coaching, leaving out the other aspects..… **[P18]**

Several interviewees understood that good coaches plus coaching contributed to the *athlete's well-being*.

C. Psychosocial and mental support sub-theme

The interviewees believed that *mental support* of athletes, specifically psycho-social support defines the *athlete's well-being*. Participants stressed that a reason why athletes retire prematurely is the lack of their emotional support. And therefore, managers and other resource providers have an important role of promoting the psychosocial and mental component of an athlete's well-being. Participants believed athletes will feel a sense of belonging to the team even when they are injured or ill, other than being a burden to a team. This is supported by the following comments;

> …. absolutely, that area of psychological support, most of our athletes retire early because they do not know about anybody who is willing to care about their emotions, and they psychological issues, of course for a human being has many other things**. [P20]**

> …the attitude of the athletes and even the managers (psychosocial support to players)…… having the hope that even when you are not well you are still part of the team (security before and after injury), most times when the athlete is not well, they look at you as a burden until you recover (security at club level). **[P3]**

> …they also need to have some kind of motivation, incentives and**… [P7]**

In conclusion, emotional support to athletes is believed to be an important aspect that defines athlete's well-being. The next sub-theme/component that emerged from the results about athlete-well-being is the *financial support*.

D. Financial support sub-theme

Participant [P18] believed that *financial support* to athletes made a difference to their well-being. However, he mentioned that the allowances received for international events are always inadequate to enable them to have proper preparations with the necessary materials as

compared to their opponents who seem are well-resourced. Such low allowances affect their well-being.

> …. good financial position to be able to play the game the game the way you want them to play; ...the allowances those are the issues that bring scandals, it is the allowances and… since our Olympians qualify based on world standards and they prove themselves they should be given a good rate but right now the rate for an Olympian is 72 dollars per day which is quite low… some of these athletes are young parents so facilitation and preparation are very important for their well-being… **[P18]**

In conclusion, financial support is believed to define athlete's well-being in this cohort of participants. The next sub-theme/component that emerged from the analysis of interviews was the education of the athletes.

E. Education, knowledge of equipment and good facilities sub-theme

The participants believed that supporting athletes with *Knowledge* about: sports equipment and how adequately and appropriately to use sports facilities contribute to athlete's well-being. The essence is to lower the risk behaviors and injuries among athletes.

> … Clubs should have proper training on the use of equipment and facilities; and for players to be educated on the proper gear… **[P23]**

> … means putting up structures to improve athletes' knowledge on many issues that would reduce risks before/during/after sports participation. **[P2]**

> …what players need in the first place to use or practice from the best facilities.. …use of best equipment…? **[P7]**

Another participant argued that the government of Uganda developed a system that enables it to identify talented individuals from the general population. This group is given extra support in the form of athletics education, thereby empowering athletes. This is regarded as an aspect of the athletes' well-being.

> ….. It is about talent identification, well-being of athletes and also looking at sport as a tool of mobilization and also as a tool for economic development to the youth…**. [P1].**

In conclusion, providing education and learning opportunities to athletes defined their well-being. *Proper nutrition* to the athletes emerged as another sub-theme/component under the definition of athlete's well-being.

F. Nutrition sub-theme

Three participants mentioned athletes' well-being relates to how they eat. The participants believe that athletes need to eat well to perform better.

> …but we need to take care of their health, feeding, in case of injury……We need to look at what he feeds on *visa vie* what he does on the pitch…. **[P1]**
>
> ….that also relates to their nutrition, they have to get advised on what kind of nutrition and what to feed they must undertake; …. **[P4]**
>
> It's very important, it's like owning a cow, when you feed it well, it will give you back good milk. If a player is looked after well taught football wise, then he will give the best of himself **[P6]**

In conclusion, the participants believed good nutrition practices contributed to athlete's well-being. The next sub-theme that emerged was athlete's performance.

G. Performance sub-theme

Participants hinted on monitoring the athlete's performance to ensure their well-being. One participant (**P7**) observed performance of an athlete has a perfect relationship with athlete's well-being or comprehensive health (as the participant **P7** termed it). The participant argued that, if the athlete is not well, then the performance will not be at a peak.

> …. his performance at the end and if they are not monitored you may not get the best results you should have got from that athlete... **[P24]**
>
> ….should have a comprehensive concern about my health (Well-being), because health has a direct impact on my performance, if my state of the health is not okay, am likely not to be at peak… **[P7]**

H. Doping

Although doping is a topical issue in sports, there was only one participant who hinted at this. The participant perceived that doping was not much of an issue that affected the athletes' well-being, and therefore could not define it in the Ugandan athlete's context.

> ……At Uganda level, doping is not really much concerned… [**P23]**

I. Empowerment of youths

One of the participants perceived the term well-being as sports development, through increasing the number of participants, health promotion strategy and source of earning for the athletes.

.. It is about talent identification, well-being of athletes and also looking at sport as a tool of mobilization and also as a tool for economic development to the youth… [P1]

The summary of the findings on the athlete's well-being theme.

The study established that the participants perceived, and described the term "athlete's well-being" in the following ways: a *health of an athlete*, *proper coaching, mental* and *financial support*, *educating the athletes*; *providing appropriate nutrients* and *monitoring performance*. Results indicate, *nutrition,* and *doping* subthems came out from one participant respectively (Table 6.3)

The next question to sports resource providers was their perceived knowledge about "best medical care practice in sports".

6.3.3: Best medical care practices theme

The thematic analysis of the transcripts revealed five sub-themes from the question about the perceived knowledge and understanding of the term "best medical care practice in sports". The sub-themes included:

Table 6.4: Sub-themes on how best medical practices were described by the participants

No.	Sub-themes	Frequency
1	Medical attention	15
2	Professional medical personal	10
3	Use of standard guidelines	4
4	Medical support	4
5	Physical fitness	3

A. Medical attention to athletes sub-theme

Under *medical attention*, the interviewees responded that this involves the evaluation of athlete's health, medical treatment and rehabilitation, in addition to health promotion.

The medical evaluation of athletes before sports participation is important to determine whether the athlete is fit to participate in any sports event. This activity justifies the practice of best medical care in sports.

> …..I would recommend having medical check-up before games because it is a risk to use players on the pitch without knowing whether they are fit…. **[P9]**

> …… will assess for any prevailing medical conditions before they participate, if somebody for instance is having a heart condition, then you advise that sports person on what kind of sports engagement one can deal in…… (Pre-participation evaluation) **[P4]**

> ……unfortunately we do not have a system in Uganda to check the cardiovascular systems, however, we need to also have daily medical check-up (cardiovascular issues), we need to check the level of fitness too…. **[P17]**

Other interviewees regarded the term best medical care in sports as services that are given to athletes during and after sports participation. Such services include: basic first aid, proper ambulance services, and appropriate referrals to specialists.

> ……..see that we need to have medical personnel with each team to have experts to handle…….the medical attention you know…alongside the coaching all these are package but we tend to end up with a physio or doctor one and two with just a simple first aid kit….**[P3]**

> **….** when a player is injured he/she receives first aid. It would be nice if we had an ambulance everyday so that if the injury is serious players are repatriated to the hospital… **[P16]**

> ……But also during the activity also, they need to be attended too, because some get injuries, or get worsening of the pre-existing conditions and all these has to be attended too and that's why there is a need…… **[P4]**

> **….**need to have basic first aid emergency care in place, we are aware if somebody gets first hand treatment, reduce risks of costs, and injury intensity hence affecting players career……. **[P9]**

> …..Being an amateur sport and limited by finances here in Africa I would look at having access to first aid during training sessions and during the games to be able to manage those minor injuries that the players may suffer… **[P13]**

> ….Recommendations and referrals to particular applicable specialist…. **[P14]**

Another form of medical service mentioned by the participant was the rehabilitation of athletes when recovering from injury. Such kind of services included strengthening and conditioning of athletes before participation in sports.

> ….We would like to see rehabilitation of the players…. **[P17]**

> ….optimization to play in brief that is strength and conditioning before play, off season and during the season… **[P22]**

One of the participants mentioned about health promotion being a component of 'best medical care practices'. For example, to prevent illness and infection, athletes need information on the outbreak of epidemics such as Ebola virus, Marburg virus, and diarrhea. Promoting physical activities in school is another component of 'best medical care in sports', since this may reduce the risk of certain diseases.

> We as a federation educate our athletes on a number of health concerns raised by the WHO since they be too busy to get this information. Example of outbreak of epidemics such as Ebola virus, Marburg virus, and diarrhea in countries where our athletes will compete. **[P5]**

> …..Besides the epidemic we also work with Ministry of Education and Sports to promote health in schools especially being aware of the benefit of physical activity especially as far as the non-communicable diseases are concerned…… **[P5]**

Further, two participants mentioned the lack of a policy to enforce the athletes' medical check-up before sports participation. The participants suggested that there should be one such a policy.

> ……unfortunately we do not have a system in Uganda to check the cardiovascular systems, however, we need to also have daily medical check-up (cardiovascular issues), we need to check the level of fitness too… **[P17]**

> ….introduce the policy of PPE to especially elite players, however, there is no national guideline, but essentially this is important… **[P22]**

B. Professional medical personal sub-theme

Some of the interviewees mentioned that if the sports people work with well-trained members from the health sector it demonstrates evidence of best medical care practice in sports. The fact that

athletes are a special group of people, means they need specialized medical personnel to attend to their special needs. The specialized medical staff in this context are the trained sports specialists.

……therefore there should be specialized personnel to be attached to these sportsmen and women in order for all their health needs to be attended to in a special way, not as a general public arrangement…. **[P4]**

….on the pitch we have trained medical personnel who can manage injuries during a game…. **[P24].**

Despite the above views and perceptions, the interviewees mentioned that there are no sports doctors or specialists to promote and support the above activities. Participant **[P9]** mentioned that the only training they normally receive is about first aid medical care. This implies that the majority of health service providers are skilled in first aid services.

……The biggest challenge is medication, which we do not have many sports doctors therefore management of injuries has been very challenging. Currently we have five injured players in the national team and up to now they are still struggling for quite a while to recover. We have more medical doctors, but not sports doctors… **[P11]**

.. I have personally attended a workshop UOC about first aid when someone gets hurt and it was attended by coaches and senior sports officials of sports, even the federation has conducted such. We have these people like medical personnel coming at our games but they also don't have enough equipment the equipment is scarce. Even us as coaches and senior officials we are able to give first aid but that is where it stops. It is only first aid. **[P9]**

C. Use of standard care protocols sub-theme

Another way of practicing *best medical care in sports is* the use of *standard care guidelines.* Participants indicated that the guidelines used in sports in Uganda are mostly obtained from either the World Health Organization, International Athletic Association Federation, World Rugby Board or from the local Ministry of Health.

> ...IAAF worked with WHO and Ministry of Education and sports to have guidelines for the team and supporting staff would follow when they arrive in Uganda… **[P5]**

> …….but we collaborate where we think there are health benefits or sports would have health issues one special case is during the pandemic of Ebola in West Africa and there were CECAFA games the team from Guinea was supposed to come to Uganda to have a friendly match we worked *(Ministry of Health*) with WHO and ministry of Education and sports to have guidelines so the team and supporting staff would follow when they arrive in Uganda **[P2]**

….. world rugby body has researched and recommended as the best practice in all the games and if we cannot do that at least do the equivalent for example if there say ambulance…… **[P21]**

D. Medical support sub-theme

Some participants mentioned about *medical support*. The medical support they referred to ranges from: (a) medical care allowances, (b) health supplements, (c) health insurance policy to access specialized services (physiotherapy), to (d) supply of information about injury management. The comments about the sub-theme follow below.

…..I would like to see that the organization for which I participate let it be a club has some basic benchmarks put in place for instance in our welfare; medical allowances or supplements as players insurance or have a medical board to give us vouchers to be attended to when we are injured…. **[P7]**

Education and awareness regarding athletes' health is regarded as a good practice in medicine. The participants had the view that athletes need medical and health care information on a daily basis. This is the response from the participants…

...doctors have to educate us... We need to practice whatever has been told by doctors, which is when the player can last longer, avoid injuries and also this will help him perform better. **[P10]**

….Medical Information to Players, coaches and Team managers applicable to sports particularly…. **[P14]**

….see that the players are informed about what injury that is and how to take care of the injuries. Players are not informed about how to take care of injuries…….. **[P16]**

A participant emphasized that injuries are part of elite sports therefore; medical insurance policy is one way of preventive measures that can be implemented to protect the health of athletes.

… is that for elite athletes at least they should be attached to a medical insurance policy, we can have an insurance policy that can cover things like basic physiotherapy for their small nagging injuries **[P8]**

E. Physical fitness sub-theme

Physical fitness was another sub-theme that emerged from content analysis of the results concerning the perception and the meaning of best medical care in sport. Under this

sub-theme, a participant responded that athletes should be physically fit. Therefore, evaluating athlete's physical fitness is a very important practice in modern medicine for sports people.

> ……..like have said, we expect the sports person, sports men and women to be physically fit, healthy and free from any illness; injuries or any other form of illness so that they able to perform very well……**[P4]**

The summary of the findings on the best medical care practices in sports theme

In summary, participants viewed *best medical care practices* as a system where the athletes are evaluated before sports participation, having specialized medical personnel working with the teams and athletes to address their complaints. In addition, the inclusion of first aid services such as ambulances on the field, appropriate and adequate referral of injured athletes contributed to *best medical practices*. Other practices that involves rehabilitation, the use standard guidelines, and provision of medical support such as medical care insurance, and information on injury prevention were perceived as best medical care practices in sports. The next question was to ask the participants if they were aware of a national sports health care policy to enforce the activities of best medical practice.

6.3.4 National sports health care policy document

The participants were again asked if they have access to a *national sports health care policy document*. They were then asked if they could describe it. The interviewees responded with mixed knowledge about a sports health care document. The majority of interviewees did not admit to having come across such document in Uganda. Some participants added that there was a general sport policy document. But the document contains clauses that only provide guidance on sports development, not particularly focusing on the medical care, and safety for athletes.

As previously indicated in the methodology section, some participants were from the sports federations. As such, these participants disclosed that there were guiding protocols that are issued by each federation to protect the athletes' health and safety. Additionally, they mentioned other protective methods used by the federations for athlete' well-being, the details are of these methods are given below.

…..I agree that we do not have a special guide, am not aware…… if it is there am not aware, but a special guide of medical care in sports …and probably we need it in terms of hygiene, nutrition for sports men, the gynms, am not sure we have that…….. **[P5]**

Have not seen such a document, they are some guidelines around, very informal. What happens is they bring a physiotherapist on board when you have a trip to make, very rarely when we have camp unless the players request for it or unless the player has an existing injury. They are not preventive at all. They come on board when you have an injury to treat it. Very informal… **[P15]**

One participant **[P3]** mentioned a general sports policy document at the Ministry of Education and Sports, but expressed concern about the specific information that is required for the health and safety of athletes. The document does not talk about anything to do with health and safety of athletes. This document highlights issues mainly for developing sports in general.

….would say at the moment we do not have concrete policies which are geared towards the well-being of the athletes….we have a general policy, and tend to focus more on promotion and development of sports in terms of numbers, in terms of eeh…..various sports, facilities, and so on and opening up of space of sponsors to come in, but you will find in that policy… **[P3]**

Other interviewees referred to the federation or association guiding protocols.

….. No national sports health care policy document am aware of now, however, we have guidelines as a federations on medical care practices….. **[P9]**

….. As a country, we do not have sports health care policy, however, at Uganda Rugby Union (URU) we do have guidelines, though the guidelines are only limited to what should be done on the day of the game. It is a world rugby policy that governs games but it doesn't cover what happens during training and after the game…. **[P23]**

One participant **[P12]** mentioned that there are ways through which they can protect athletes. This is by using the contract agreements with athletes. The agreements are developed and signed when a new athlete is taken by the club agent. However, the participants' views seemed to highlight the fact that the agreements do not look into the appropriate medical care, but rather focus on other administrative rights.

…… We do not have any policy that supports and re-enforces the well-being of players. Policies about sports in Uganda overall are very weak and these are things just in development and of course medicine is lagging behind in that area but I can see there is a lot of fight for players rights, employment contracts so there is a lot of movement to protect players but it has not yet reached the medical field…… **[P12]**

The summary of the findings on national sports health care policy document

The study established that there was no national sports health care policy document in Uganda. The available policy document only expounds how sports are developed in Uganda. The study further established, the athlete's well-being in Uganda seemed to be protected through two methods:

a. The use of contract-agreements. In the contract agreement, participants argued that they do not have enough evidence that such contracts protect the safety and health of the athletes. The agreements only have details about athlete's work periods and pay rights.

b. The use of individual federation guidelines. Participants from the four federations where research was carried out (athletics, basketball, football and rugby) mentioned about committees that develop the federation guidelines to protect the health of their athletes. These guidelines are a replica of the respective international sports organizations to which they belong. For example, the committee for football develops national football guidelines, which are adopted from the Federation of International Football association (FIFA). It is through these guidelines that athletes' health and safety is protected. The developed guidelines are not for national sports health care programmes. The next question was for the participants to comment on the committees drafting and developing the guiding protocols within the individual federations.

6.3.5: Human resource capacity/committee for sports health care policies theme

The study also aimed to establish the available human resource capital drafting and developing any sports health care guiding protocols (Policies). Some interviewees admitted knowing members in their federations developing such guidelines. These participants were then asked to comment about the committee members that develop guidelines in the federations. The responses are based on the individual participant's federation as shown in the (Table 6.5 below).

The quotation below generalizes what is done when drafting and developing policy-guidelines for the federations.

> … The federations have different committees and each committee has its own guidelines and regulations, so they are all drafted, they are all there and put in one piece but it depends on individual committees for that particular federation **[P7].**

In the case of Uganda Rugby Union, the quotation from the federation participant is given below;

> …We have Dr. Kalanzi Joseph who is the chairman of our medical body. He has vast experience and currently he has been appointed to head the African rugby medical commission and he is currently developing policies having developed for us as a country. We have Dr. Samuel Guma who is now heading the Uganda Olympic medical commission. We have Dr. Michael Aleku who heads the physiotherapy of the Olympic committee. We have Dr. Leonard Were IAA clinic in Juba. And with such quality of guys, we do not interfere with medical care policy development, we receive their recommendations and that's it ….. **[P12]**

In the case of the football association, the participant mentioned that they work with many stake holders including the Uganda Ministry of Health (MoH), and the international organizations such as FIFA, IOC and WHO. They use local experts, and the local community health care service systems, to develop and harmonize these international health care guiding protocols into a local context.

> ……FUFA... I could say one thing, one we have done activities with the Ministry Of Health officials in terms of fighting against malaria, in terms of issues concerning polio to sensitize people but as a sensitization tool, internally we have Dr. S who is an official in the ministry of health, Dr. O who is also an instructor at Mulago referral hospital. We are working with Dr. K who is an experienced medical person that has been in the sport for long. We are also working with Uganda Olympic Committee as a member, also share programme that come with it. We also share in the programmes that they come up with apart from the FIFA and CAF programmes. But must agree, we have not met develop for any policy regarding best care in sports. **[P3]**

Table 6.5: Committees and specialists from each Federation

No.	Committee	Specialists
1	Rugby Medical Committee	Emergency medical specialist, physiotherapist, nutritionist, first aider, doctor
2	Athletics Medical Committee	Physician, doctor, physiotherapist and emergencies medical specialist
3	Basketball Medical Committee	Use the National Olympic Committee medical board
4	Football Medical Committee	Physiotherapist, and doctors

The summary of the findings on the human resource sub-theme

This study further established the following:

I. There is no national committee board in charge of sports health care policy development. The available committees that are mentioned above support federations to develop guidelines. Further, Table 6.5 shows that Uganda's sports sector has a diverse group of medical and health specialist.

6.4 THE OVERALL SUMMARY AND CONCLUSION OF STUDY FOUR

This is the first sports and health care study conducted in Uganda. This study yielded useful information concerning sports health care policies in Uganda. Firstly, the participants demonstrated a fair understanding of the components of the athlete's well-being and best medical care practices in sports. The major concern is the low number of participants that mentioned about nutrition, doping and athlete's; performance as items that are necessary to contribute to athlete's' well-being. Secondly, there was no national sports health care policy document in Uganda to mandate the practice of the principles under athlete's well-being or even best medical practices. The athlete's' well-being in Uganda seemed to be protected through the use of contract-agreements. However, the agreements only have details about an athlete's work periods and pay rights. Lastly, the study established:

I. The lack of national committee in charge of sports health care policy development. The available committees are for individual federations. With each having its own experts and developing their guidelines

II. The country had a diverse group of specialists developing sports health guidelines: Doctors, Physiotherapists, nurses, nutritionist and emergency medicine doctor (Table 6.5 above).

In conclusion, the study objectives which were to determine barriers to the implementation of best medical care practices in Uganda were achieved. The lack of national committee on best medical care practice in sports, and national sports health care policy are two major concerns that need to be addressed urgently by the stakeholders. The athletes' health and safety may seem more guaranteed if there is a law to protect their overall well-being.

CHAPTER 7

THESIS SUMMARIES AND CONCLUSIONS

7.1 OVERVIEW

The primary goal of the study was to assess and document the available medical care services for injured athletes in Uganda from the time of injury until the athlete returned to sports participation. The objective was to establish barriers to best medical care practices in sports in Uganda. More specifically, the thesis investigated: (1) the best medical practices which health workers in Uganda use to prevent, and manage injured athletes (Chapter 3); (2) the level of the knowledge and practice on the best practice principles among the Ugandan sports resource providers (Chapter 4); (3) the state and quality of the various facilities (sports, medical and high performance) in Uganda which service injured athletes (Chapter 5); (4) there constitutional laws or policies encouraging injury prevention and appropriate medical care for athletes (Chapter 6). This is the first study in Ugandawhich has these objectives.

7.1.1 Chapter 3

The aim of this study was to observe and document medical services offered to the injured athletes pre- and post-injury situations until the athlete returned to sports participation.

In summary, nine conditions/types of injury were assessed (Figure 3.1). The results indicated that:

(1) The lack of specific pre-season screening or return-to-play readiness for all the injured athletes (Table 3.2).
(2) The lack of application of best practice principles to manage the injury types. For athletes who received medical care, the results showed inconsistences and inadequacies from the acute stage of the injury to return-to-sports participation (Tables 3.3-3.9).

In conclusion, these findings suggest the lack of up-to-date knowledge among the sports resource providers; the inappropriate, and inadequate specific facilities being used by athletes for sports and injury management, and the lack of policies to mandate care of injured athletes. These barriers may detract from applying best medical practices.

7.1.2 Chapter 4

This study two investigated the level of knowledge and practices among the sports resource providers towards the best practice principles in sports.

In summary, the results confirmed that:

(1) The participants' knowledge and understanding of the components/themes of the athlete's well-being, and international sports bodies were both good. However, this was not translated into best practices.
(2) There were inconsistances in knowledge and application of recommended guidelines on prevention, emergency medical care, intermediate and rehabilitation care. To elaborate this further, by the time this study was done the participants' score on PPHE/PHE was below the acceptable 60% mark (Figure 4.3-4.4). The literature has also shown there are time-constraints for the physician to conduct the test and there are expenses associated with the tests. There are further reports that some guidelines are still evolving. All these factors may have contributed to the poor medical practices towards PPHE/PHE.
(3) For the intermediate and rehabilitation knowledge and practices, the participants demonstrate fairly better scores (Figure 4.5-4.6).

In conclusion, this study confirms that inadequate knowledge and awareness are barriers to best practices in sports in Uganda.

7.1.3 Chapter 5

The objective of this study was to assess the standard of the various facility equipment and services (sports, medical and high performance) which services injured athletes.

In summary, the results revealed:

1. The standard of sports facilities were far below the recommended national or checklist measures. Specifically, a majority of the items deemed vital for health and safety of athletes, including medical services from the health and hygiene department were lacking in standard.
2. The health care facility departments/units across the country were weaker and inadequate (Table 5.8). Specifically, the emergency, and the rehabilitation. The

access, health and safety of the high-performance centre did not comform with the checklist standards (Table 5.10).

In conclusion, the study confirms that Uganda's sports and medical facilities do not conform with international standards, therefore this compromised the compliance of adopting the sports best medical practices.

7.1.4 Chapter 6

The aim of this study was to establish the constitutional laws or policies encouraging injury prevention and medical care for athletes.

The results revealed that there was no national sports health care policy document in Uganda.

I agree that we do not have a special guide, am not aware…… if it is there am not aware, but a special guide of medical care in sports …and probably we need it in terms of hygiene, nutrition for sports men, the gynms, am not sure we have that…….. **[P5]**

The policy document that existed only expounds how sports are developed in Uganda. Further inquires from the federations policy makers, established that the athlete's well-being in Uganda seemed to be protected through the use of contract-agreements and specific federation training and match guidelines. The guidelines were mentioned to be a replica of the respective international sports organizations to which they belong. The athletes' health and safety is protected through these guidelines. In conclusion, this study also confirms that the lack of compliance to best practices in sports is due to absence of national health care sports policy.

7.2 RECOMMENDATIONS

This thesis has established barriers to the implementation of best practices in sports in Uganda. This leads to the following recommendations:

i. There is a need to create awareness and increase advocacy for best practices in sports. Much of the information on the principles of best practice can be obtained for free from the international sports body's websites. Awareness of this high quality free information should be increased. The principles of best practice should include the demonstration of the role of the multidisciplinary team (Figure 2.4) and the multi-sectoral approach in managing the athlete's well-being. This implies that the Ministry of Education and Sports should be assisted by other line Ministries such as Health, Gender and social development, Works and Local governments' ministerial departments to improve on the sports, and health facility infrastructures and capacity building.

ii. There is a need to improve the sports health service providers' knowledge of the best medical practices in sports. Also the number of trained personnel in sports medicine practices should be increased.

iii. There is a need to improve the sports facility's medical units.

iv. The government needs to develop a national sports health care policy to mandate the management of the well-being of athletes in Uganda. Specifically, the policy should focus on trying to increase knowledge about the athletes' health and how it should be protected. Other policy focus areas include: mandating Pre-participation medical evaluation of athletes at amataeur and elite levels; emphasize on acute, intermediate and rehabiliatation care of injured athletes, this should also include medical clearance before an athlete return to sports. There is a need to strengthen a policy to maintain and protect the sports facilities and high performance centers across the country.

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APPENDICES

Appendix 1: Knowledge and practice questionnaire

Establishing optimal behaviors of coaches/managers and health service providers on the implementation of best medical care practices in sports

SECTION A

Demographic information:

a) Demographic and general information

1. Gender
   a) _ Female ☐
   b) _ Male ☐
2. Age (years only).....

3. What is your highest level of education?
   a) Certificate ☐
   b) Diploma ☐
   c) Degree ☐
   d) Post graduate ☐
   e) Others…….....(please specify)
   .....

5. Have you previously participated in any sporting activity? Yes / No
   a. Which one?
   b. At what level (recreational, a mature, elite or professional level)
   c. Number of years you have participated in sports.....
6. Specifically what is your responsibility or job? .....
7. Are you a full time employee?

Yes	No

SECTION B

1. In your job, are you required to contribute to a players or athlete's wellbeing?

Yes	No

If the answer is **no** move to question **2**, if the answer is **yes** move to section **b & c;**

b. In your opinion, how important are these factors to a player's wellbeing?

	Very important	Important	Moderately important	Of little importance	Unimportant
Doping					
Coaching					
Sports performance					
Injury & illness prevention					
Mental health					
Nutrition					

c. How do you rate your own competence in assisting the athlete in managing the following categories or circumstances?

	Very good	Good	Barely acceptable	Poor	Very poor
Doping					
Coaching					
Sports performance					
Injury & illness prevention					
Mental health					
Nutrition					
Any other (Specify)…….					

2. Do you know the goals and objectives of any of the following organization? WHO, IOC, FIFA, IAAF, FINA, WADA and FIBA

Yes	No

If the answer is **No** move to question 3, if the answer is **Yes** move to section b & c

	Strongly agree	Agree	undecided	Disagree	Strongly disagree
WHO					
IOC					
FIFA					
IAAF					
FINA					
WADA					
FIBA					
Others (specify)……..					

b. In sourcing information on the wellbeing of players or athletes, how important are these international organizations?

Organizations	Very important	Important	Moderately important	Of little importance	Unimportant
WHO					
IOC					
FIFA					
IAAF					

FINA					
WADA					
FIBA					
Others (specify)……..					

c. In sourcing information on the wellbeing of players or athletes, how often do you use these international organization websites?

Organizations	Very frequently	Frequently	Occasionally	Rarely	Very rarely	Never
WHO						
IOC						
FIFA						
IAAF						
FINA						
WADA						
FIBA						
Others (specify)……..						

3. How do you rate your knowledge on the following topics?

	Extremely poor	Below average	Average	Above average	Excellent
Periodic Health Evaluation (PHE) as part of the athletes/players healthcare program.					
Pre-participation Examination (PPE) is part of healthcare program for athletes and players.					

b. Rate the following statement as applicable to you.

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
When players/athletes undergo periodic health examination, there is a need to do pre-participation examination also (PPE).					

c. How often do you use the following examples on your athletes or players?

	Very frequently	Frequently	Occasionally	Rarely	Very rarely	Never
I use Periodic Health Evaluation to monitor the athletes/player's wellbeing.						
I use Periodic Health Evaluation to educate players/athletes about other health risk related behaviors.						

4. In your position, are you required to administer basic life support?

Yes	No

If the answer is **No** move to question 5, if the answer is **Yes** move to section b & c,

b. If a player collapses, and is unconscious with a suspected foreign body airway obstruction, (choking). In your opinion, it is right to **firstly**;

Action	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
I Call the ambulance first and then do CPR					
I Call ambulance while simultaneously giving 1-5 back blows					
I Call ambulance while encouraging a player/athlete to cough					

c. In your position, how often do you use the following protocols as primary care of a **calf muscle strain** of player or athlete on the sports court or field?

Action	Very frequently	Frequently	Occasionally	Rarely	Very rarely	Never
a. Danger Respond Airway, Breathing, Circulation (DRABC)						
b. Airway, Breathing, Circulation, Disability & Exposure (ABCDE)						
c. Stop, Analyze, Listen, Touch, Active, Passive & Support (SALTAPS)						
d. Rest, Ice, Compression & Elevation (RICE)						

5. Have you attended or treated an athlete or player with acute musculoskeletal problems?

Yes No

If the answer is No move to question 6, if the answer is **Yes** move to section b & c,

b. Which of the following protocols would be appropriate for an injured player or athlete;

I. Bruised muscle

Action	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
e. Danger Respond Airway, Breathing, Circulation (DRABC)					
f. Airway, Breathing, Circulation, Disability & Exposure (ABCDE)					
g. Stop, Analyze, Listen, Touch, Active, Passive & Support (SALTAPS)					
h. Rest, Ice, Compression & Elevation (RICE)					

II. Ruptured muscle

Action	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
a. Danger Respond Airway, Breathing, Circulation (DRABC)					
b. Airway, Breathing, Circulation, Disability & Exposure (ABCDE)					
c. Stop, Analyze, Listen, Touch, Active, Passive & Support (SALTAPS)					

d. Rest, Ice, Compression & Elevation (RICE)					

III. Concussed player sitting on the pitch or field

Action	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
a. Danger Respond Airway, Breathing, Circulation (DRABC)					
b. Airway, Breathing, Circulation, Disability & Exposure (ABCDE)					
c. Stop, Analyze, Listen, Touch, Active, Passive & Support (SALTAPS)					
d. Rest, Ice, Compression & Elevation (RICE)					

IV. Fractured ankle joint on the field or pitch

Action	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
a. Danger Respond Airway, Breathing, Circulation (DRABC)					
b. Airway, Breathing, Circulation, Disability & Exposure (ABCDE)					
c. Stop, Analyze, Listen, Touch, Active, Passive & Support (SALTAPS)					
d. Rest, Ice, Compression & Elevation (RICE)					

V. Dressings and bandages are used for;

Action	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Reducing pain					
Reducing internal bleeding					
Help control bleeding					
Prevention of infection					
Make it easier to remove the player or athlete after injury					

5. In your position, do you ever refer players or athlete's to other health service providers?

Yes No

If the answer is **No** move to question 7, if the answer is **Yes** move to section b & c,

b. Who do you think a player or athlete, who has sustained the following injuries during participation in sports event, should consult for a diagnosis?

Concussion

Specialists	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Physiotherapist					
Orthopedic surgeon.					
Radiologist for scan or x-ray					

Traditional bone setter					
General doctor					
Sports physician					

Tibia fracture

Specialists	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Physiotherapist					
Orthopedic surgeon					
Radiologist for scan or x-ray					
Traditional bone setter					
General doctor					
Sports physician					

c. How often do you refer a player or athlete after fracture during training or match time to see the following?

I

Specialists	Very frequently	Frequently	Occasionally	Rarely	Very rarely	Never
Physiotherapist						
Orthopedic surgeon						
Radiologist for scan or x-ray						
Traditional bone setter						
General doctor						
Sports physician						

II

How often do you refer a player or athlete with sudden chest pain and un able to walk by himself after a game or training (see below)?

Specialists	Very frequent	Frequent	Occasionally	Rarely	Very rarely	Never
Physiotherapist						
Orthopedic surgeon						
Radiologist for scan or x-ray						
Traditional bone setter						
General doctor						
Sports physician						

Cardiologist						

6. In your position, are you required to record and report sports injury circumstances when they occur or when athletes or players report such incidence?

Yes	No

If the answer is **No** move to question 8, if the answer is **Yes** move to section b & c,

b. In your opinion, which of the following statements are correct?

Definition	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
A recurrent injury is an injury of the same type which occurs after a player's return to full participation from the previous injury					
The severity of an injury is the number of days that have elapsed from the date of injury to the date of the player's return to full participation in team training and availability for match selection					
A recurrent injury is an injury of the same type and at the same site as an previous injury and which occurs after a player's return to full participation from the previous injury					

c. Which of the following tools do you use often for monitoring and reporting of sports injury circumstances?

Tools	**Very frequently**	**Frequently**	**Occasionally**	**Rarely**	**Very rarely**	**Never**
SCAT (Standard Concussion Assessment Tool)						
F-MARC- Injury report forms						
IOC- Injury report form						
GPS (Global Positioning System)						
Daily Analysis of Life demands of Athletes (DALDA)						

7. Do you provide treatment to athlete's or player's injuries after their participation in sports activities?

Yes	No

If the answer is **No** move to question 9, if the answer is **Yes** move to section b & c,

b. In your opinion, would you treat the following cases using surgical means?

Injury conditions	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
Ankle strain					
Muscle contusion					
Fractured tibia					
concussion					
Shin pain					

Anterior cruciate ligament (ACL) rapture					

c. Do you provide non-surgical treatment to the following sports injury problems;

Injury conditions	**Very frequently**	**frequently**	**Occasionally**	**Really**	**Never**
Ankle strain					
Muscle contusion					
Fractured tibia					
concussion					
Shin pain					
Anterior cruciate ligament (ACL) rapture					

8. For your job, have you managed a concussed player or athlete before?

Yes No

If the answer is **No** move to question 10, if the answer is **Yes** move to section b & c,

b. Indicate your level of agreement with the following statements.

	Case opinion and management	**Strongly agree**	**Agree**	**Undecided**	**Disagree1**	**Disagree strongly**
1	A Concussed player or athlete is assessed on the pitch/sideline, referred to hospital or medical center, then after, start the return –to-play protocol.					
2	For suspected concussed player or athlete-on pitch/sideline is assessed, then after, start the return-to-play protocol					
3	For a player or athlete diagnosed with concussion, the return-to-play protocol will depend on the time symptoms are resolved					
4	During the treatment of a concussed player, assist a player in activities that require concentration and attention until symptoms are absent for a minimum of 24hrs consecutively without medication					

9. For your job, are you required to manage or participate during a player's or athlete's rehabilitation phase?

Yes No

If the answer is **Yes** move to section b & c, if the answer is no, thank you for attending to the above questions.

b. The following specialists are important during the rehabilitation phase of a player or athletes with an hamstring injury.

	Experts	**Strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
1	Sports Physician					
2	Physiotherapist					
3	Strength and conditioning expert					
4	Psychologist and Sociologist					
5	Nutritionist/dietitians					
6	Surgeons					

7	Cardiologist					
8	Urologist					
9	Nurse					
10	Occupational therapist					
11	Sports analyst					
12	A chiropractor					
13	Traditional bone setter					

c. The following statements are applicable during the rehabilitation phase of an injured player or athletes?

		Very frequently	**Frequently**	**Occasionally**	**Rarely**	**Very rarely**	**Never**
1	Work with families and friends						
2	I respect his/her dignity or rights as other patients						
3	I monitor & evaluate his/her recovery stages on every day basis						
4	I / we allow advice on diet and fluids						
5	I advice on use of banned substances						
6	I allow talking to the team mate and visiting friends						
7	I work with Sports physicians						
8	I / we allow religious Leaders or cultural leaders as part of the team during rehabilitation phase						
9	I / we evaluate athlete/player's recovery depending on athletes' symptoms resolution						
10	It is the duty of a physiotherapists to perform periodic health examination and pre-participation examination						
11	It is a duty of a coach to perform a periodic health evaluation and pre-participation examination						

END

Appendix 2: Uganda National Medical Centre Facility checklist

Uganda National Medical Centres Facility checklist

To be completed by the researcher

Facility Name.....
District.....

Investigator.....

Medical Superintendent Authorities' details:
Date.....

Age.....
Phone..... M F

Sex..... Email:
.....

Operation:

Days.....
Hours.....to.....

	Specialist and Items	YES	NO	N/A	Comment/barriers
A	First impressions				
	I. You instantly feel "at home" with staff you meet?				
	II. Do staff and members look like they're enjoying themselves?				
B	Facility and operations				
	Location	**Completely**	**Partially**	**Poor**	
	I. Is the facility an easy drive to and from & clear sign posts?				
	II. Is there a good mass-transit system that will drop you near the door?				
	III. Does the facility offer transportation services to and from the centre?				
	IV. Accessibility for People With Disability				

	Parking				
	I. Is there ample off-street & on-site parking with generous stalls?				
	II. Is the parking lot and walkway safely lit and close to the entrance?				
	Maintenance and safety				
	I. Is the facility clean and well-maintained?				
	II. Managing outbreak of communicable diseases				
	III. Contingency plans (evacuation plans & fire safety rehearsals)				
	IV. Confidentiality practices (informed consents)				
B	Management environment				
	I. Access to service				
	II. Full & accurate information record unit				
	III. Professional code of conduct available				
	IV. Staff committed to their work and records show				
	V. Admissions, referral up and down, &discharge policies in place.				
	VI. No legal proceedings against the hospital				
C	Specialists				
	I. General surgeons				
	II. Orthopaedic surgeons				
	III. Opticians				
	IV. Ear, Nose and Throat surgeon/specialist				
	V. Physiotherapists				
	VI. General practioners				
	VII. Doctors				
	VIII. Neuro-surgeon & Neuro-Physician				
	IX. Pharmacists				

	X. Environmental health officer				
	XI. Lab. Technicians & Technologists				
	XII. Social workers				
	XIII. Optometrists				
	XIV. Radiographers				
	XV. dieticians				
E	**Hygiene & Sanitation**				
	I. Toilets & audited & lighting available				
	II. Shower rooms & change rooms & audited				
	III. Dustbin				
	IV. Infection control facilities available & audited				
	V. Airflow control & audited				
	VI. Washing & drying facilities & audited				
	VII. Floor cleaning materials & audited				
F	**Facility Area**				
	I. Weight room & audited				
	II. Women room & audited				
	III. Men room & audited				
	IV. Flooring (Carpet, tiles or others) & audited				
G	**Units / departments**				
	Rehabilitation Unit				
	I. Health care team & accreditation				
	II. Re-conditioning service				
	III. Occupational therapy services				
	IV. Physiotherapists				
	V. Availability & accessibility of rehab equipments				
	VI. Climbing gym materials available & audited				
	VII. Equipment room & audited				

	VIII. Flooring (Carpet, tiles or others) & audited				
	IX. Materials for making assistive devices or collaboration with other companies which make assistive devices				
	X. Fridge, ultra-sound therapeutic machine & other therapeutic equipments available and audited.				
	Nutrition & catering Unit				
	I. Experts available & accreditation				
	II. Nutritional guidelines followed				
	Research and Training/preventive health				
	Gynaecology and Obstetrics				
	Surgical department				
	I. Hand books available (Primary surgery & orthopaedics and trauma				
	II. Contact details of surgeon and staff on duty				
	III. Resuscitation check-list and staff on duty & audited equipments as well.				
	IV. Equipments for the theatre and audited				
	V. Clinical support available (dental and ultrasonography services)				
	VI. Local & International Collaborations				
	Trauma				
	I. 24 hours service				
	II. Treat & observe medical & surgical cases				
	III. Treat & report psychological cases				
	IV. Availability of Primary Health Care Training Manual				
	V. Telephone contacts & intercom communication				

	VI. Poison Manual				
	VII. Posters in Casualty displaying CPR procedures & Glasgow Coma Scale measurements				
	VIII. Emergency trolley				
	IX. Airway materials available				
	X. Bleeding equipment				
	XI. Cardiac Care				
	XII. Splinting and Plaster Of Paris materials				
	XIII. Ear, Nose and Throat emergency care				
	Neural-clinic				
	Mental health				
	I. Team approach to the case				
	II. Appropriate area temporary seclusion of a patient				
	III. Private room for counselling				
	IV. Staff available & specialized				
	Pharmacy				
	I. Essential Drug List all available all times				
	II. Comply with local & international Good Pharmacy Practices				
	III. Manage drugs & medical supplies according to defined standard operating procedures				
	IV. Secure storeroom, & audited				
	Outpatient clinic				
	I. Oral clinic available				
	II. Basic ophthalmic available				
	III. Basic curative services available				
	IV. Referral system available				

	Radiology				
	I. X-ray machines available				
	II. MRI available				
	III. CT-SCAN available				
	IV. Ultra-sound diagnostic available				
	Laboratory				
	I. Biochemistry tests available				
	II. Haematology tests available				
	III. Lung function test available				
	IV. Micro-biology tests available				
	Counselling, social workers & support services				
	Oral health care				
	I. Dental unit complete				
	II. Aseptical trolley available				
	III. Dental autoclave available				
	IV. Telephone contacts displayed				
	V. Practice guidelines for Primary Oral Health Care available				

Appendix 3: Uganda National Sports High Performance Centre Facility checklist

Uganda National Sports High Performance Centre Facility checklist

To be completed by the researcher

Facility Name.....
District.....

Investigator.....

Stadium authorities' details:
Date.....

Age.....
Phone..... M F

Sex..... Email:
.....

Qualification.....
Professional.....

Operation:

Days.....
Hours.....to.....

	Specialist and Items				Comment/barriers
A	First impressions	**Yes**	**No**	**N/A**	
	III. You instantly feel "at home" with staff you meet?				
	IV. Do staff and members look like they're enjoying themselves?				
B	Facility and operations	**Yes**	**No**	**N/A**	
	Location				
	V. Is the facility an easy drive to and from?				
	VI. Is there a good mass-transit system that will drop you near the door				
	VII. Does the facility offer transportation services to and from the centre?				
	Parking	**Complete**	**Partially**	**Poor**	

	III. Is there ample off-street parking with generous stalls?				
	IV. Is the parking lot and walkway safely lit and close to the entrance?				
	Maintenance and safety	**Complete**	**Partially**	**Poor**	
	V. Is the facility clean and well-maintained?				
	VI. Do classes and workout areas offer plenty of space (neither crowded nor cluttered)?				
	VII. Is the facility well lit on the outside and inside?				
	VIII. Does the facility have nonslip flooring?				
	IX. Are signs visible and easy to understand?				
	X. Does the facility have handrails throughout the centre?				
	XI. It has Automated external defibrillator & oxygen (audited)				
	XII. Administration awareness of policies concerning sports health care				
	XIII. Does the ventilation system seem adequate without forceful fans?				
	Accessibility	**Yes**	**No**	**N/A**	
	I. Does the facility have power-door openers at exterior and interior entrances?				
	II. Are all areas of the facility accessible to wheelchairs?				
	III. Is there elevator access to all floors of the centre?				
	IV. Is the facility open during the days and hours that best fit For athletes/players?				
C	Program offerings				
	Getting started	**Complete**	**Partially**	**Poor**	
	I. Does the facility offer health and wellness screenings?				
	II. Does the facility offer functional fitness assessments?				

	III. Does the facility offer orientations of equipment and other facility resources?				
	IV. Do staffs help with realistic goal setting for individual needs?				
	V. Do staffs create a custom plan to help clients reach their goals?				
	Physical training programs	**Yes**	**No**	**N/A**	
	XVI. Does the facility offer a variety of training programs?				
	XVII. Cardiovascular training?				
	XVIII. Strength training?				
	XIX. Flexibility training?				
	XX. Balance training?				
	XXI. Others.....				
	Educational and motivational programs				
	Does the facility offer classes on the following	**Yes**	**No**	**N/A**	
	VIII. Nutrition and weight loss?				
	IX. Specific medical conditions? (e.g., diabetes, high blood pressure, arthritis, heart disease)				
	X. Behavioural modification?				
	XI. Pain management?				
	XII. Stress management?				
	XIII. Mental acuity?				
	XIV. Emotional health?				
	XV. Other:				
	Communication	**Yes**	**No**	**N/A**	
	Does the facility offer other forms of information?				
	V. Newsletter?				
	VI. Web site?				

	VII. Bulletin board?				
	VIII. Newspaper or magazine?				
	IX. Special events?				
	Personal services				
	Does the club offer the following personal service options	**Yes**	**No**	**N/A**	
	I. Free, ongoing general assistance?				
	II. Personal training for one-on-one attention?				
	III. Doctor-ordered rehabilitation therapy?				
	IV. Licensed massage therapy?				
	V. Other:				
	Special needs	**Completely**	**Partially**	**Poor**	
	I. Does the facility offer programs designed to address chronic and age-related conditions (e.g. osteoporosis, cardiovascular disease, diabetes, balance abnormalities, muscular weakness, etc.)?				
	II. Do the classes have different levels of intensity and duration, modifiable to your needs?				
	III. Do the staff work hand-in-hand with physicians if they have a health issues?				
	Variety and convenience	**Yes**	**No**	**N/A**	
	If there is a pool, is there a variety of both water- and I. land-based activities?				
	II. Are both group and individual activities available?				
	III. Do the hours and program times match with clients preferred schedule?				
	IV. Does the facility have regularly scheduled events designed to help keep clients				

	informed and inspired?				
D	Equipment, amenities & Auditing of equipment				
	Condition and availability	**Completely**	**Partially**	**Poor**	
	I. Is the equipment modern?				
	II. Is the equipment clean?				
	III. Is the equipment safe and working properly?				
	IV. Are there enough machines to avoid having to wait a long time for client's turn?				
	V. Are all of the workout and personal spaces (locker rooms) bright, clean, and uncluttered?				
	VI. Are stretching areas or stations roomy and away from traffic?				
	VII. Are all areas accessible to clients?				
	Diversity of offerings	**Yes**	**No**	**N/A**	
	Do they have the following?				
	III. Cardiovascular training machines? (e.g., treadmills, upright and recumbent bikes, steppers, elliptical, etc.)				
	IV. Strength-training machines? (e.g., free weights, weight machines, etc.)				
	V. Flexibility equipment? (for yoga, Pilates, etc.				
	VI. Balance equipment?				
	VII. Exercise and/or lap pool (indoor)?				
	VIII. Spa?				
	IX. Open floor space for stretching and workouts?				
	X. Classroom(s) with chairs and tables?				
	XI. Showers & lockers?				
	XII. Private dressing areas & Towels?				
	XIII. Comfy social areas?				

	XIV. Filtered water readily available?				
	XV. Healthy snacks and beverages?				
	Specific age-friendly features & audited	**Completely**	**Partially**	**Poor**	
	I. Is a significant percentage of the equipment age-friendly?				
	Does the cardiovascular equipment have the following age-friendly features?				
	II. Display panels that are easy to read, reach, change, and understand**?**				
	III. Quick, easy access (mount and dismount) for individuals with a variety of functional abilities and disabilities?				
	IV. Slow starting speeds, ideally 0.mph?				
	V. Emergency lanyards with belt clip?				
	Does the strength-building equipment have the following age-friendly features?				
	I. Instructional placard with simple diagrams, easy to-read text?				
	II. Range-of-motion adjustments for various body sizes and functional limitations?				
	III. Easily adjusted hand, seat, and pad positions?				
	IV. Low starting resistance, fewer than five pounds?				
	V. Ability to change resistance from a seated position?				
E	Staff and management	**Yes**	**No**	**N/A**	
	I. Is the code of conduct for staffs available?				
	Personal traits				
	I. Are the staffs friendly, responsive, and caring?				
	II. Are staffs always happy to answer clients questions—and do it in a way clients can understand?				

	III. Are clients comfortable with the staff's average age and gender profile?				
	IV. Does there always seem to be a sufficient ratio of staff to members?				
	V. Are staffs easy to identify and locate?				
	Training and qualifications				
	I. Are some or all of the staff trained to deal with the special needs of vulnerable clients**?**				
	II. Are staffs properly trained to identify the warning signs of fatigue or distress and to handle emergencies that may arise**?**				
	III. Do all staff members have CPR and first aid training?				
	IV. Are staffs knowledgeable about the impact that medication can have on exercise?				
	V. Does the facility have the following on-site or readily available? Doctors, nurses, Physiotherapist, Athletic trainers....)				
	Social integration				
	I. Does this facility encourage and vigorously support group activities?				
	II. Does the atmosphere (decor, communal spaces, music, etc.) seem friendly and inviting?				
	III. Do members and staff easily and positively interact with each other?				
	IV. Does the facility give membership discounts or free trials to friends and family?				
	V. Do they have areas built-in for socializing, such as comfortable lounge areas with snacks and beverages available?				
	VI. Does it have a membership				

	clients feel comfortable with (age, gender, interests, etc.)?				
E	**Business practices, contracts, credentials**	**Yes**	**No**	**N/A**	
	General				
	I. Does the facility have a good reputation in the community				
	II. Have they (or their parent company) been in business at least 0 years?				
	III. Do they have a system for resolving member complaints and other issues?				
	Contracts and fees				
	I. Does the facility offer free trial memberships?				
	II. Does the facility have a written set of rules?				
	III. Are all fees, monthly dues, and other costs in clear, written form and posted?				
	IV. Are the contracts and marketing materials available in large print?				
	Credentials				
	I. Does the organization belong to a internationally or nationally-recognized professional fitness association?				
	II. Does the facility conform to all relevant federal, state, and local regulations, such as: (a) Good safety records, no case about the organisation or company owning the performance centre and No fines by the government				

Appendix 4: Uganda National Athletics Facility checklist

Uganda National Athletics Sports Facility checklist

To be completed by the researcher

Facility Name.....
District.....

Investigator.....

Stadium authorities' details:
Date.....

Age.....
Phone..... M F

Sex..... Email:
.....

Qualification.....

Operation:

Days.....
Hours.....to.....

	Specialist and Items	Poor	Partial	Complete	Comment/barriers
A	**Stadium management & Facilities**				
	I. Sign posts indicating direction				
	II. Stadium code of conduct				
	III. Civil protection unit (police,etc) & CCTV cameras				
	IV. Field facility	**Yes**	**No**	**N/A**	**Comment/barriers**
	a. Oval & 8 straight lanes for 100 & 110m hurdles b. Shot put c. Water-jump steeplechase d. Long & trip jump e. High Jump f. Pole Vault g. Discuss & hammer h. Javelin space i. Marked 400m oval track acceptable				
		Poor	**Partial**	**Complete**	**Comment/barriers**
	V. Stadium Operational Manual				

	VI. Stadium contingency				
	VII. Change rooms (team, referees & officials)				
	VIII. Support spectator area available & accessible for People With Disabilities				
	IX. Risk assessment reporting & ground regulations procedures (spectators throwing bottles, stones)				
	X. Stadium areas & Zones				
	XI. Emergency services (fire warning & detection system, security officer in charge)				
	XII. Floodlights & stand by generator				
B	**Hygiene & Sanitation**				
	XVI. Toilets				
	XVII. Shower rooms & change rooms				
	XVIII. Dustbin				
C	**Participating field surfaces**				
	X. Athletic track				
	XI. Synthetic & Glass cover				
	XII. Water infiltration rate				
	XIII. Thickness for different disciplines				
D	**Stadium health care services (First aid certification)**				
	I. Administration awareness of policies concerning sports health care				
	II. Doping control station & expert				
	III. Athlete medical care rooms				
	IV. Ambulance services				
	V. Emergency plan				
	VI. Injury surveillance reporting				
	VII. Service time of medical team				
	VIII. Communication tools on the field (cell phone or walkie				

	talkies				
	IX. Medical doctor,				
	X. Nurse				
	XI. Physiotherapist				
	XII. Ambulance personnel				
	XIII. First aider				
	XIV. Health care team dress codes (observed)				
	XV. Medical station				
	XVI. Support service area available (stewards)				
	XVII. Other medical experts				

Appendix 5: Uganda National Rugby Union sports Facility checklist

Uganda National Rugby Sports Facility checklist

To be completed by the researcher

Facility Name.....
District.....

Investigator.....

Stadium authorities' details:
Date.....

Age.....
Phone..... M F

Sex..... Email:
.....

Qualification.....

Operation:

Days.....
Hours.....to.....

	Specialist and Items	Poor	Partial	complete	Comment/barriers
A	**Stadium management**				
	I. Sign posts indicating direction				
	II. Stadium code of conduct				
	III. Civil protection unit (police, etc) & CCTV cameras				
	IV. Goal posts & Nets white, with grey goal post supports Plus spare goal posts, nets and corner flags close to field				
	V. Turf or surface cover (natural or artificial),				
	VI. Stadium Operational Manual				
	VII. Stadium contingency				
	VIII. Change rooms (team, referees & officials)				
	IX. Support spectator area available & accessible for				

	People With Disabilities				
	X. Risk assessment reporting & ground regulations procedures (spectators throwing bottles, stones)				
	XI. Stadium areas & Zones				
	XII. Emergency services (fire warning & detection system, security officer in charge)				
	XIII. Play dimensions standard (L=105, W= 68: Surface area; L=125, W=80)				
	XIV. Floodlights & stand by generator				
B	**Hygiene & Sanitation**				
	XIX. Toilets				
	XX. Shower rooms & change rooms				
	XXI. Dustbin				
C	**Playing quality of football field surface**				
	XIV. Ball rebound resilience				
	XV. Ball rolling resistance				
	XVI. Traction				
	XVII. Hardness of the surface				
	XVIII. Surface evenness				
	XIX. Glass cover according to IRB regulation 22				
	XX. Water infiltration rate				
	XXI. IRB-Standard field & 5m area space around it				
D	**Stadium health care services**				
	I. Administration awareness of policies concerning sports health care				
	II. Doping control station				
	III. Athlete medical care rooms a) Suitable electrical lighting b) Running water c) Examination couch d) Spinal immobilisation equipments e) Diagnostic equipment				

	f) Life support equipment (oxygen & AED)				
	IV. Ambulance services				
	V. Emergency plan				
	VI. Injury surveillance reports				
	VII. Service time of medical team				
	VIII. Communication tools on the field (cell phone or walkie talkies				
	IX. Medical doctor,				
	X. Nurse				
	XI. Physiotherapist				
	XII. Ambulance personnel				
	XIII. First aider				
	XIV. Health care team dress codes (observed)				
	XV. Medical station at the field				
	XVI. Support service area available (stewards)				
	XVII. Other medical experts				
	SUMMARY (4 SUB-UNITS WITH 41ITEMS)				

Appendix 6: Uganda National Basketball sports Facility checklist

Uganda National Basketball Sports Facility checklist

To be completed by the researcher

Facility Name.....
District.....

Investigator.....

Manager details:
Date.....

Age.....
Phone..... M F

Sex..... Email:
.....

Qualification.....

Operation:

Days.....
Hours.....to.....

	Specialist and Items	Poor	Partial	Complete	Comment/barriers
A	**Facility and operation**				
	I. Stadium operational manual				
	II. Communication tools on the field (cell phone or walkie takies				
	III. Court marked lines (0.05m width)				
	IV. Support spectator area available & accessible for People With Disabilities				
	V. Court lighting details				
	VI. Support service area available				
	VII. Change rooms (team, referes & officials				
	VIII. Playing floor details available				
	IX. Sign posts indicating direction				

	X. Civil protection unit (police,CCTV cameras etc)				
	XI. Fence wall protected with cushion from court				
	XII. Buffer zone distance from the court				
	XIII. Position of the basketball backboard				
B	**Hygiene & Sanitation**				
	I. Toilets				
	II. showrooms				
	III. Dustbin				
C	**Medical service**				
	I. Ambulance personnel				
	II. First aider				
	III. Health care team dress codes (observed)				
	IV. Medical station				
	V. Ambulance services				
	VI. Medical experts (DR. Physiotherapists, Nurses, dentists)				
	VII. Injury surveillance reports				
	VIII. Doping control station				
	IX. Service time of medical team				

Appendix 7: Uganda National football sports facility checklist

Uganda National football Sports Facility checklist

To be completed by the researcher

Facility Name.....
District.....

Investigator.....

Stadium authorities' details:
Date.....

Age.....
Phone..... M F

Sex..... Email:
.....

Qualification.....

Operation:

Days.....
Hours.....to.....

	Specialist and Items	Poor	Partial	Complete	Comment/barriers
A	**Stadium management**				
	I. Sign posts indicating direction				
	II. Stadium code of conduct				
	III. Civil protection unit (police, etc) & CCTV cameras				
	IV. Goal posts & Nets white, with grey goal post supports Plus spare goal posts, nets and corner flags close to field				
	V. Turf or surface cover (natural or artificial)				
	VI. Stadium Operational Manual				
	VII. Stadium contingency				
	VIII. Change rooms (team, referees & officials)				
	IX. Support spectator area available & accessible for				

	People With Disabilities				
	X. Risk assessment reporting & ground regulations procedures (spectators throwing bottles, stones)				
	XI. Stadium areas & Zones				
	XII. Emergency services (fire warning & detection system, security officer in charge)				
	XIII. Play dimensions standard (L=105, W= 68: Surface area; L=125, W=80)				
	XIV. Floodlights & stand by generator				
B	**Hygiene & Sanitation**				
	XXII. Toilets				
	XXIII. Shower rooms & change rooms				
	XXIV. Dustbin				
C	**Playing quality of football field surface**				
	XXII. Ball rebound resilience				
	XXIII. Ball rolling resistance				
	XXIV. Traction				
	XXV. Hardness of the surface				
	XXVI. Surface evenness				
	XXVII. Glass cover				
	XVIII. Water infiltration rate				
D	**Stadium health care services**				
	I. Administration awareness of policies concerning sports health care				
	II. Doping control station				
	III. Athlete medical care rooms (couch, oxygen & AED available & audited)				
	IV. Ambulance services				
	V. Emergency plan				
	VI. Injury surveillance reports				
	VII. Service time of medical team				

	VIII.	Communication tools on the field (cell phone or walkie-talkies				
	IX.	Medical doctor,				
	X.	Nurse				
	XI.	Physiotherapist				
	XII.	Ambulance personnel				
	XIII.	First aider				
	XIV.	Health care team dress codes (observed)				
	XV.	Medical station				
	XVI.	Support service area available (stewards)				
	XVII.	Other medical experts				

Appendix 8: Interview guide

INTERVIEW GUIDE

Policy and human resource issues at the Ministry of Health, Ministry of Education, and in sports organisation in Uganda

Dear respondent,

Thank you very much for agreeing to talk to me, I am Samuel lubega and am doing this research project through the University of Cape Town. Doping, sudden cardiac arrests and catastrophic injuries in sports have caused controversial issues surrounding the medical care practices for athletes.

Therefore, this interview is part of my PhD study entitled "Implementation of best medical care practices in sports in developing countries, Uganda's four major sports code (Football, Rugby, Athletics and Basketball) have been selected for this study.

This study aims at providing evidences about the health situation of athletes and players in Uganda, and also making recommendation about sport health care policies, incorporating principles of best practice which can be adopted in Uganda. Therefore, I kindly requested you to answer the following questions about health policies and human resource issues about health care in sports as honestly as possible. It is part of a larger study about best medical care practices in sports in Uganda.

The information you will provide will be treated with confidentiality. Thank you in advance for your cooperation

b) Demographic and general information

2. Gender
   a) _ Female ☐
   b) _ Male ☐

2. Age (years only).....

3. What is your highest level of education?
   f) Certificate ☐
   g) Diploma ☐
   h) Degree ☐
   i) Post graduate ☐
   j) Others……(please specify)
   .....

4. Do you currently participate in sporting activity? Yes/No
   a. Which one?
   b. At what level (recreational, a mature, elite or professional level)
   c. Number of years you have participated in sports.....

5. Have you previously participated in any sporting activity? Yes / No
   d. Which one?
   e. At what level (recreational, a mature, elite or professional level)
   f. Number of years you have participated in sports.....

c) Policy and Human resource issues:

1. How do you explain the well-being and best medical care of athletes at the ministry or in your organisation?
2. In your opinion, how important is the well-being of athletes or players for Uganda? (not important, important or very important)
3. Do you have policies that support well-being of athletics? Yes/No
   What are the policies available to support and promote the well-being of athletes in Uganda?
4. What are those policies specifically looking at medical care of athletes in Uganda?
5. In your opinion, how important are these policies in health care system in Uganda? (Not important, important or very important).
6. Has the state been involved in supporting these policies? If yes, how? If No, Why?
7. Could you describe the various people involved or you work with in drafting sports health care policies?
8. Do people involved or you work with have training with regards to sports health care policies?
9. How often do you get continued training on sports health policies?
10. Have you heard about the
    a. IAAF ☐
    b. IOC, ☐
    c. FIFA ☐
    d. And IRB organization? ☐
11. How important are they to you?
12. What information do you normally seek for from these international sporting organisations?

Appendix 9: Permission to conduct research from president office, Kampala

Department of Human Biology
UCT/MRC Research Unit for Exercise Science & Sports Medicine
Faculty of Health Sciences, University of Cape Town
Private Bag, Rondebosch 7700, South Africa
Tel: + 27-21-650-4558 Fax: + 27-21-686-7530

6th October. 2014

THE PRESIDENT'S OFFICE
RESEARCH SECRETARIAT
P O BOX 7168
KAMPALA, UGANDA.

RE: REQUEST FOR PERMISSION TO USE GOVERNMENT ARCHIVES

This is to introduce myself, the principal investigator as **Samuel Lubega**, Ugandan citizen, a PhD candidate at Sports Science Institute of South Africa (http://essm.uct.ac.za/students/), Department of Human Biology, Faculty of Health Science (http://www.health.uct.ac.za/), University of Cape Town (http://www.uct.ac.za/home/). I am requesting for permission to conduct research within the Ministry of Education and Sports (MOE/S), and Ministry of Health (MOH).

In 2012, a bill was passed in the parliament of Uganda to encourage all government and non-government staff to do physical activities. Another bill is already tabled in the parliament to professionalize sports in Uganda. While there are many positive results from increasing physical activity and participating in sport at all levels (recreational, amateur, elite and professional) there is also an increased risk of serious injury. Injured individuals sometime have long hospitalization periods, and, in some cases, the outcomes may have long-term morbidities for young elite athletes. If these sports-related injuries occur in developing countries such as Uganda, where there are limited opportunities for professional sportsmen/women, in addition to quality medical care, the injured individual may not be able to meet his/her work commitments. This may have socio-economic implications for the individual and nation at large. Another consequence of an individual incurring an injury is the psychological perspective that manifests as anger, anxiety, depression and low self-esteem.

It is against above the background that I developed a research project with guidance from my supervisor Prof. Mike Lambert (Mike.lambert@uct.ac.za) at the research unit at the University of Cape Tow mentioned above. The title of my project is; ***Investigating the implementation of best practices in sports in underdeveloped and developing countries; A study of the four major sports codes in Uganda*** *(Football, Athletics, Rugby and Basketball)*. This research requires that I visit and interview authorities at the above mentioned government ministries, government and private hospital facilities, government and private sports facilities and gymnasiums. I will further get information regarding health care policies from government policy documents. The Commissioner for Higher Education and Training

Appendix 10: Application for expedited review to conduct research

Department of Human Biology
UCT/MRC RESEARCH UNIT FOR EXERCISE SCIENCE & SPORTS MEDICINE
Faculty of Health Sciences, University of Cape Town
Private Bag, Rondebosch 7700, South Africa
Tel: + 27-21-650-4558 Fax: + 27-21-686-7530
Mike.Lambert@uct.ac.za

2nd September, 2014

The Chair,
Higher Degree, Research and Ethical Committee
School of Public Health, College of Health Sciences
Makerere University
P.O.Box 7072
Kampala,
Uganda

Dear Sir,

RE: Application for expedited review to conduct research

Please find attached our application to conduct research with accompanying materials. The proposed research project "***Examining the implementation of best medical care practices in sports in underdeveloped & developing countries: Study of the major sportin codes in Uganda***" is the research that will be carried out under the auspices of the Researc Unit of Exercise science and Sports Medicine (http://essm.uct.ac.za/) in the Department of Human Biology at the University of Cape Town, South Africa (www.uct.ac.za). The projec wil be conducted in collaboration with the Ministry of Education & Sports, Uganda (http://www.education.go.ug/).

We would like to request for an **expedited review** for this protocol. This protocol poses "*n to minimal*" risks to the participants as we are only reviewing institution documents, carryi out observations, administering questionnaires and conducting interviews. We are not engaging in any physical invasive procedures and the identity of the partipants will be protected at all times. We will obviously be happy to answer any questions you may have about the study.

Yours sincerely,

Signature Removed

Lubega Samuel Kiwanuka
Principal Investigator (PhD candidate)
Cell: +27710162449; +27715006930, +256783562322
Email:lbgsam001@myuct.ac.za; lubegasmlk41@gmail.com

Prof. Mike Lambert
Supervisor

Appendix 11: University of Cape Town, human research ethics Letter

UNIVERSITY OF CAPE TOWN

Faculty of Health Sciences

Human Research Ethics Committee

Room E52-24 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone (021) 406 6338 • **Facsimile** (021) 406 6411
Email: shuretta.thomas@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

05 September 2014

HREC REF: 584/2014

Prof M Lambert
Sport Science Institute

Dear Prof Lambert

PROJECT TITLE: INVESTIGATING THE IMPLEMENTATION OF BEST MEDICAL CARE PRACTICES IN SPORTS IN UNDERDEVELOPED & DEVELOPING COUNTRIES: STUDY OF MAJOR SPORTING CODES IN UGANDA (PhD Candidate - S Lubega)

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

- Please provide the HREC with copies of approval letters from the Ugandan Ministry of Health and Ministry of Education and Sports, once approval has been obtained from these authorities.

Approval is granted for one year until the 30th September 2015.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

We acknowledge that the student, Samuel Lubega will also be involved in this study.

Please quote the HREC reference no in all your correspondence.

Yours sincerely

Signature Removed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN ETHICS
Federal Wide Assurance Number: FWA00001637.

HREC 584/2014

Appendix 12: School of Public Health, Makerere University ethics letter

MAKERERE UNIVERSITY

P.O. Box 7072 Kampala Uganda
Website: www.musph.ac.ug

Tel: 256 414 532207/543872/543437
Fax: 256 414 531807

COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
HIGHER DEGREES, RESEARCH AND ETHICS COMMITTEE

02nd October, 2014

The Executive Secretary,
Uganda National Council of Science and Technology

Dear Sir,

Re: Recommendation for clearance of a proposal titled: Examining the implementation of best medical care practices in sports in underdeveloped and developing countries: study of the major sporting codes in Uganda

The above proposal by Lubega Samuel Kiwanuka was reviewed by the Higher Degrees Research and Ethics Committee using the expedited review criteria.

The purpose for this communication is to recommend his proposal, data collection tools and consent forms to you for approval.

He will attach the approved current version of the protocol.

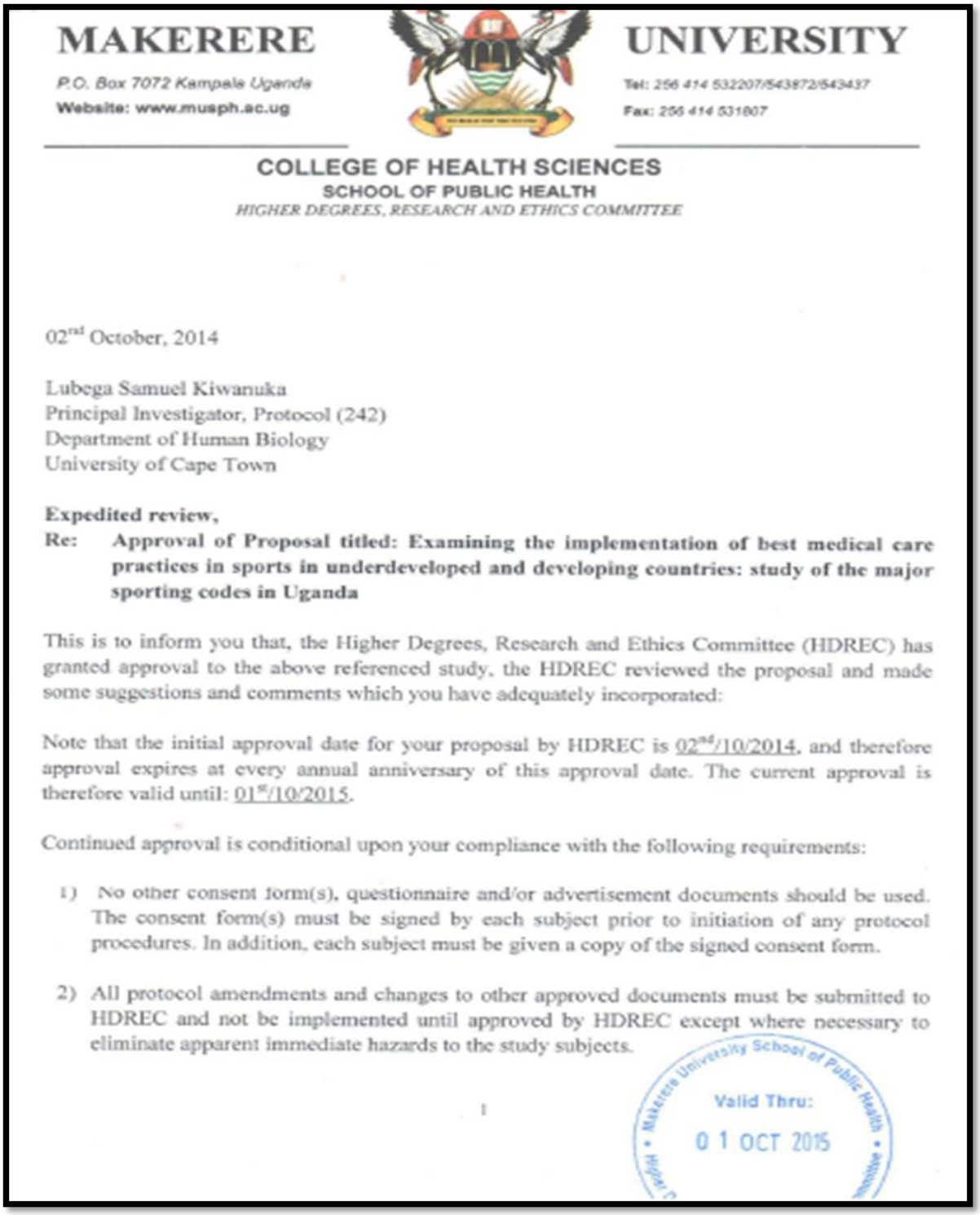
Yours sincerely,

Makerere University School of Public Health
Higher Degrees, Research and Ethics Committee
Valid Thru:
15

Signature Removed

Assoc. Prof. Lynn Atuyambe
Vice Chairman: Higher Degrees, Research and Ethics Committee

Appendix 13: Makerere University ethics letter



MAKERERE UNIVERSITY

P.O. Box 7072 Kampala Uganda
Website: www.musph.ac.ug

Tel: 256 414 532207/543872/543437
Fax: 256 414 531807

COLLEGE OF HEALTH SCIENCES
SCHOOL OF PUBLIC HEALTH
HIGHER DEGREES, RESEARCH AND ETHICS COMMITTEE

02nd October, 2014

Lubega Samuel Kiwanuka
Principal Investigator, Protocol (242)
Department of Human Biology
University of Cape Town

Expedited review,

Re: Approval of Proposal titled: Examining the implementation of best medical care practices in sports in underdeveloped and developing countries: study of the major sporting codes in Uganda

This is to inform you that, the Higher Degrees, Research and Ethics Committee (HDREC) has granted approval to the above referenced study, the HDREC reviewed the proposal and made some suggestions and comments which you have adequately incorporated:

Note that the initial approval date for your proposal by HDREC is 02nd/10/2014, and therefore approval expires at every annual anniversary of this approval date. The current approval is therefore valid until: 01st/10/2015.

Continued approval is conditional upon your compliance with the following requirements:

1) No other consent form(s), questionnaire and/or advertisement documents should be used. The consent form(s) must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject must be given a copy of the signed consent form.

2) All protocol amendments and changes to other approved documents must be submitted to HDREC and not be implemented until approved by HDREC except where necessary to eliminate apparent immediate hazards to the study subjects.

Makerere University School of Public Health
Valid Thru:
01 OCT 2015

3) Significant changes to the study site and significant deviations from the research protocol and all unanticipated problems that may involve risks or affect the safety or welfare of subjects or others, or that may affect the integrity of the research must be promptly reported to HDREC.
4) All deaths, life threatening problems or serious or unexpected adverse events, *whether related to the study or not*, must be reported to HDREC in a timely manner as specified in the National Guidelines for Research Involving Humans as Research Participants.

- Please complete and submit reports to HDREC as follows:

a) For renewal of the study approval – complete and return the continuing Review Report – Renewal Request (Form 404A) at least 60 days prior to the expiration of the approval period. The study cannot continue until re-approved by HDREC.

b) Completion, termination, or if not renewing the project – send a final report within 90 days upon completion of the study.

- Finally, the legal requirement in Uganda is that all research activities must be registered with the National Council of Science and Technology. The forms for this registration can be obtained from their website www.uncst.go.ug. Please contact the Administrative Assistant of the Higher Degrees, Research and Ethics Committee at wtusiime@musph.ac.ug or telephone number (256)-41-543872 or +256772496136 if you encounter any problems.

Yours sincerely

Makerere University School of Public Health
Valid Thru:
01 OCT 2015
Higher Degrees, Research and Ethics Committee

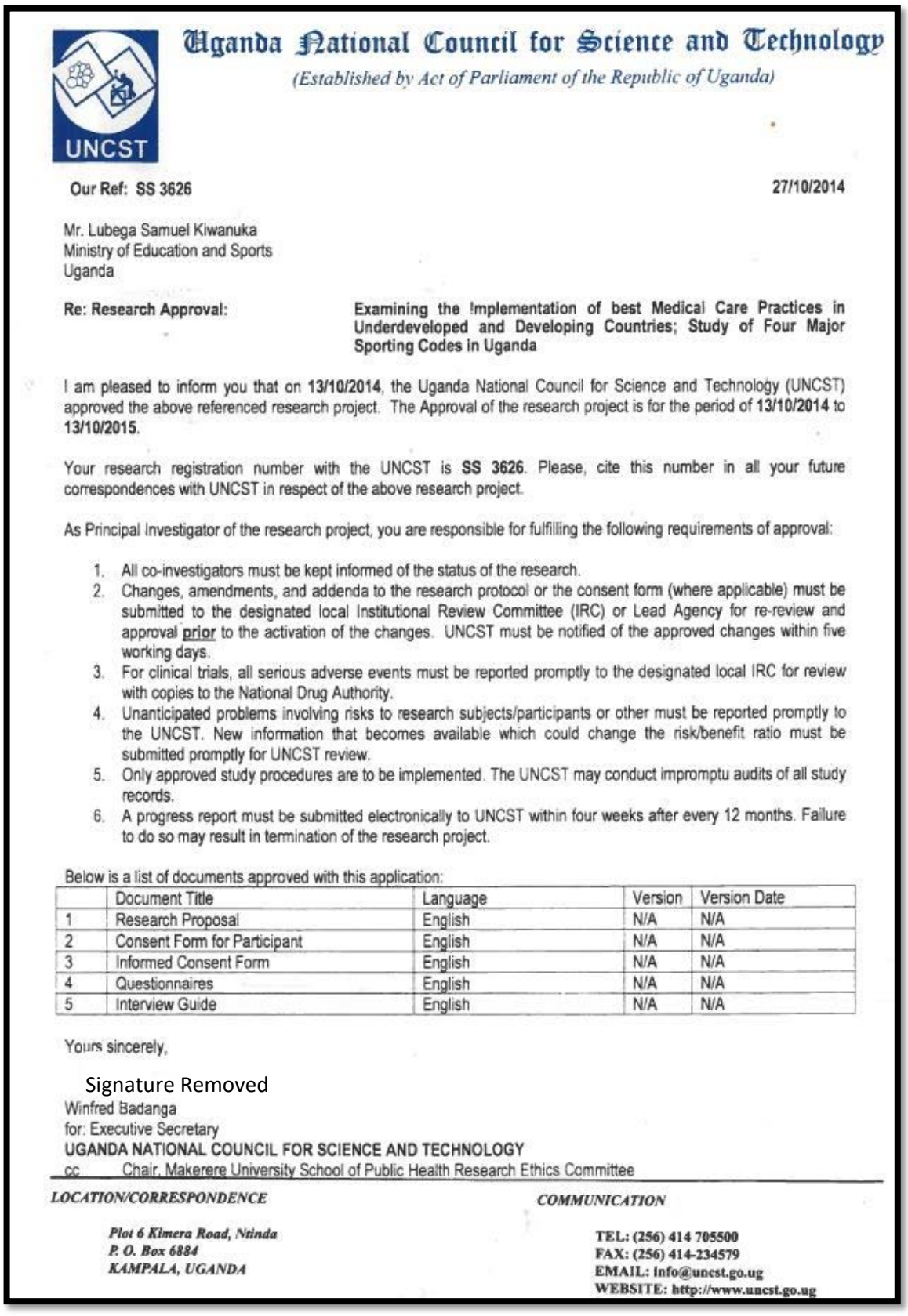
Signature Removed

Assoc. Prof. Lynn Atuyambe
Vice Chairman, Higher Degrees, Research and Ethics Committee

Enclosures:

a) A stamped, approved study documents (informed consent documents):

Appendix 14: Uganda National Council for Science and Technology ethics letter



Uganda National Council for Science and Technology

(Established by Act of Parliament of the Republic of Uganda)

UNCST

Our Ref: SS 3626 **27/10/2014**

Mr. Lubega Samuel Kiwanuka
Ministry of Education and Sports
Uganda

Re: Research Approval: **Examining the Implementation of best Medical Care Practices in Underdeveloped and Developing Countries; Study of Four Major Sporting Codes in Uganda**

I am pleased to inform you that on **13/10/2014**, the Uganda National Council for Science and Technology (UNCST) approved the above referenced research project. The Approval of the research project is for the period of **13/10/2014** to **13/10/2015**.

Your research registration number with the UNCST is **SS 3626**. Please, cite this number in all your future correspondences with UNCST in respect of the above research project.

As Principal Investigator of the research project, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the research.
2. Changes, amendments, and addenda to the research protocol or the consent form (where applicable) must be submitted to the designated local Institutional Review Committee (IRC) or Lead Agency for re-review and approval **prior** to the activation of the changes. UNCST must be notified of the approved changes within five working days.
3. For clinical trials, all serious adverse events must be reported promptly to the designated local IRC for review with copies to the National Drug Authority.
4. Unanticipated problems involving risks to research subjects/participants or other must be reported promptly to the UNCST. New information that becomes available which could change the risk/benefit ratio must be submitted promptly for UNCST review.
5. Only approved study procedures are to be implemented. The UNCST may conduct impromptu audits of all study records.
6. A progress report must be submitted electronically to UNCST within four weeks after every 12 months. Failure to do so may result in termination of the research project.

Below is a list of documents approved with this application:

	Document Title	Language	Version	Version Date
1	Research Proposal	English	N/A	N/A
2	Consent Form for Participant	English	N/A	N/A
3	Informed Consent Form	English	N/A	N/A
4	Questionnaires	English	N/A	N/A
5	Interview Guide	English	N/A	N/A

Yours sincerely,

Signature Removed

Winfred Badanga
for: Executive Secretary
UGANDA NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY
cc Chair, Makerere University School of Public Health Research Ethics Committee

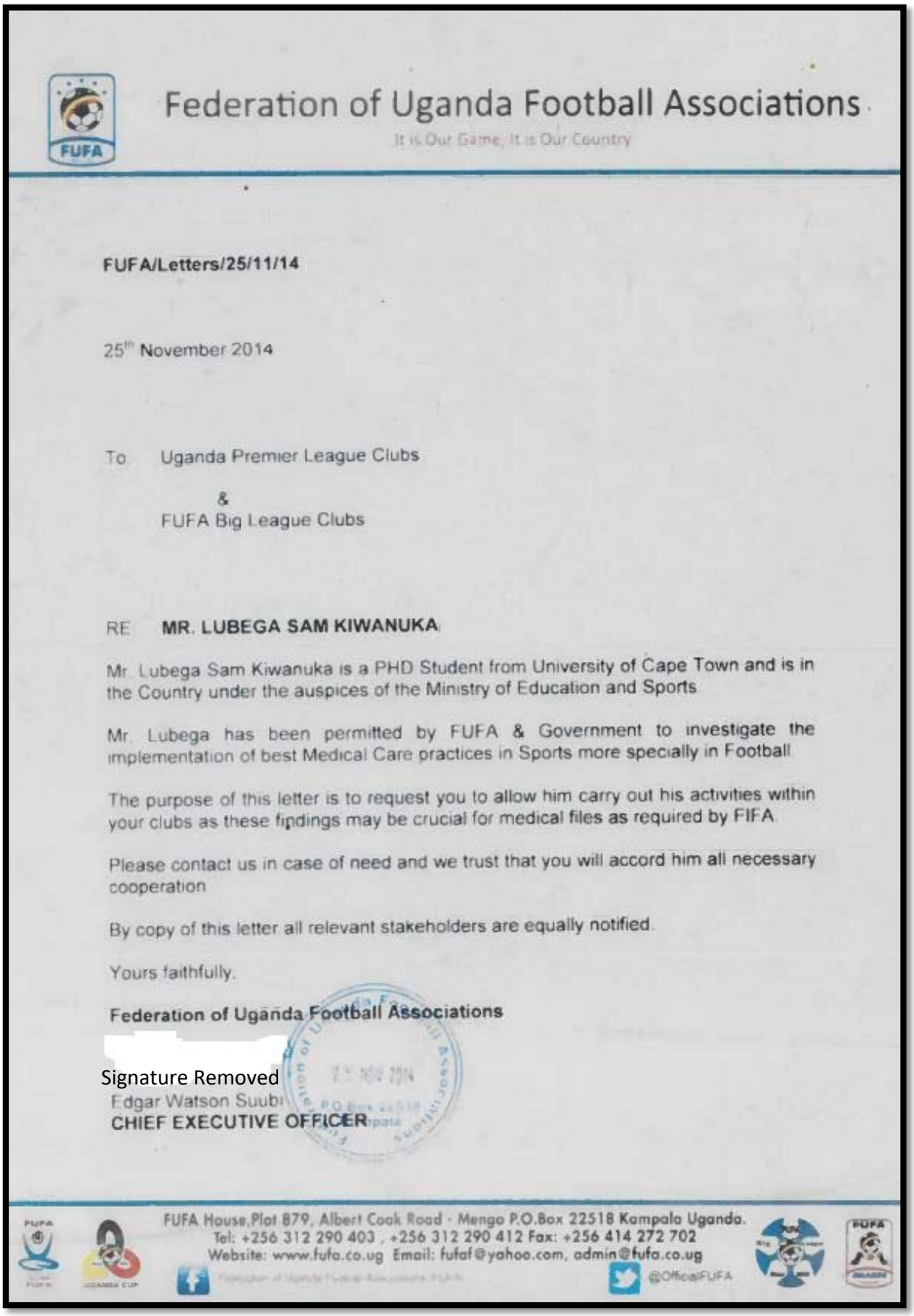
LOCATION/CORRESPONDENCE

Plot 6 Kimera Road, Ntinda
P. O. Box 6884
KAMPALA, UGANDA

COMMUNICATION

TEL: (256) 414 705500
FAX: (256) 414-234579
EMAIL: info@uncst.go.ug
WEBSITE: http://www.uncst.go.ug

Appendix 15: Federation of Uganda Football Associations permission



Federation of Uganda Football Associations

It is Our Game, It is Our Country

FUFA/Letters/25/11/14

25th November 2014

To Uganda Premier League Clubs

&

FUFA Big League Clubs

RE **MR. LUBEGA SAM KIWANUKA**

Mr. Lubega Sam Kiwanuka is a PHD Student from University of Cape Town and is in the Country under the auspices of the Ministry of Education and Sports

Mr. Lubega has been permitted by FUFA & Government to investigate the implementation of best Medical Care practices in Sports more specially in Football

The purpose of this letter is to request you to allow him carry out his activities within your clubs as these findings may be crucial for medical files as required by FIFA

Please contact us in case of need and we trust that you will accord him all necessary cooperation

By copy of this letter all relevant stakeholders are equally notified.

Yours faithfully.

Federation of Uganda Football Associations

Signature Removed

Edgar Watson Suubi

CHIEF EXECUTIVE OFFICER

FUFA House,Plot 879, Albert Cook Road - Mengo P.O.Box 22518 Kampala Uganda.
Tel: +256 312 290 403 , +256 312 290 412 Fax: +256 414 272 702
Website: www.fufa.co.ug Email: fufaf@yahoo.com, admin@fufa.co.ug

@OfficialFUFA

Appendix 16: Uganda Rugby Union permission

Uganda Rugby Union

Member, International Rugby Board (IRB)
Member, Confederation of African Rugby (CAR)
Member, Rugby Football Union of East Africa (RFUEA)

November 25, 2011

Dear Member Club

RE: LUBEGA SAMUEL KIWANUKA

The above mentioned is a PHD student from University of Cape Town whose project title is 'investigating the implementation of best medical care practices in sports in underdeveloped & developing countries: study of the major sporting codes in Uganda.

He has been to see us at the URU and he would like to do some research in your Club on the same.

Please kindly accord him the audience and assistance he needs.

Yours truly

Signature Removed

Ramsey Olinga
Chief Executive Officer

Uganda Rugby Union Secretariat, Lugogo Tennis Club, Lugogo Bypass, P. O. Box 22108, Kampala, UGANDA
Tel: +256 41 259280 / Fax: +256 41 259280 / Email: info@ugandarugby.com

Appendix 17: Federation of Uganda Basketball Associations permission

Federation of Uganda Basketball Associations.

P.O. BOX 7637 Kampala, Uganda
Fax: + 256(0)41 258350

Member of:
Federation of International Basketball Associations (FIBA)
Federation of International Basketball Association, Africa (FIBA, AFRICA)
Federation of International Basketball Associations Africa Zone V (FIBA Africa Zone V)

OFFICE OF THE VICE, PRESIDENT ADMINISTRATION

REF: FUBA/ADM/NTS – 22/11/2014

THE BASKETBALL CLUB MANAGER

Dear Members,

RE: LUBEGA SAMUEL KIWANUKA

The above matter refers:

The above mentioned is a PhD student from University of Cape Town whose project title is, investigating the implementation of best medical care practices in sports in underdeveloped and developing countries: study of the major sporting codes in Uganda.

The purpose of this letter is to request your club to allow him carry out his activities within your clubs as these may be crucial for medical files as required by FUBA.

Please contact us in case of need and we trust that you will accord him all necessary cooperation.

FUBA shall be grateful for your usual cooperation.

Thanks.
Yours Sincerely
FEDERATION OF UGANDA BASKETBALL ASSOCIATIONS, (FUBA)

Signature Removed

22 NOV 2014
P. O. BOX 7637, KAMPALA

Dr. OGWEL BENARD PATRICK (PhD)
VP. ADM/GENERAL SEC. FUBA

CC- President, FUBA

President	V.P. Administration	V.P. Technical & competitions	V.P. Finance	V.P. marketing, Media & Pub.
Ambrose Tashobya	Ogwel Benard patrick	Yunus Nkutu	Musisi Robert	Ali Balunywa
Tel: +256772867888	Tel: +256772626599	Tel: +256712632985	Tel: +256702518977	Tel: +256752694917
+256712867888	+256702939468	+254725381778	+256777512518	+256701512222
Email: [illegible]	patogwala@yahoo.co.uk	yunuskmtu@yahoo.com	musisi@hotmail.com	ali.balunywa@ug.zinlet.com

Appendix 18: Uganda Athletics Federation permission

UGANDA ATHLETICS FEDERATION

Affiliated to: International Association of Athletics Federations
AAC, EAA, UOC

Registered with: National Council of Sports

Metropole House, Ground Floor
Plot 8-10 Entebbe Road
P.O. Box 22726 Kampala Uganda
Tel/Fax: +256 - 414 - 340342
Tel: +256 - 312 - 340342
Email: uga@mlisat.org

UAF/ADMIN/2014/02

November 26, 2014

Member Association Representatives/Coaches/Managers:

Re: **LETTER OF INTRODUCTION: MR. LUBEGA SAMUEL KIWANUKA**

The bearer named above is a PhD student at the University of Cape Town. He is conducting a research in sports; *implementation of best medical care practices in sports in underdeveloped and developing countries: study of major sporting codes in Uganda.* He will require your time and guidance as he carries out this exercise.

The purpose of this letter is to introduce to you Mr. Lubega Samuel Kiwanuka. He will present to you a questionnaire and carry out any further interviews to facilitate his research work. Kindly avail him with any feasible support as deemed possible. This research work will further benefit the work of the federation in future references.

Your assistance is highly appreciated.

Yours faithfully

Signature Removed

Timothy Masaba
ADMINISTRATIVE OFFICER

Appendix 19: Participant's informed consent

Department of Human Biology
UCT/MRC Research Unit for Exercise Science & Sports Medicine
Faculty of Health Sciences, University of Cape Town
Private Bag, Rondebosch 7700, South Africa
Tel: + 27 21 650 4561
Fax: + 27 21 686 7530

EXAMINATION OF THE IMPLEMENTATION OF BEST MEDICAL CARE PRACTICES IN SPORTS IN UNDERDEVELOPED & DEVELOPING COUNTRIES: STUDY OF MAJOR SPORTING CODES IN UGANDA

INFORMED CONSENT

I, the undersigned, have been fully informed about the UCT/MRC Research Unit for Exercise Science and Sports Medicine within the Department of Human Biology of the University of Cape Town's study regarding the **implementation of best medical care practices in sports in underdeveloped & developing countries**. I have agreed to answer questions, and the answers I am providing will be used to establish the current sport health care facilities, equipments and medical stuff that support the implementation process of best medical care in sports in Uganda. I have also agreed to provide personal particulars, sports participation behaviour data, and understand that all the information that is collected during the study will be treated with the strictest confidentiality and will only be used for scientific research purposes. I also understand that my name and personal particulars will be not released under any circumstances and that all data will be analysed anonymously.

I agree to participate in the study and I have been informed that I will be free to withdraw from the study at any time if I so wish. I understand that my questionnaire materials will be destroyed on completion of the study on the best medical care in sports in Uganda. I also understand that I will be free to request that my questionnaire materials be destroyed before the completion of the study.

I understand that whilst there is no direct benefit to myself, if the available health care policy and organisation structures are established, future generations may be better equipped and prepared to properly deal with the negative aspects of physical activity in Uganda. This may allow better prevention and future treatment options. I understand that I will receive the overall results of the study. I have read (or where appropriate, have had read to me) and understand the information about this study, and any questions I have asked have been answered to my satisfaction. I agree that research data provided by me or with my permission during the project may be included in a thesis, presented at conferences and published in journals on the condition that neither my name nor any other identifying information is used.

Any questions regarding this project may be directed to the Principle Investigators: **Prof. Mike Lambert** on telephone number **021 650 4558** email **mike.lambert@uct.ac.za**.

This study has obtained ethical approval from the UCT Faculty of Health Sciences Research Ethic Committee (FHS REC). If you have any complaints or queries that the investigator has not been able to answer to your satisfaction, you may contact **Prof Marc Blockman** from the FHS REC on telephone number **021 406 6452**.

FULL NAME OF SUBJECT: _____

SUBJECT'S SIGNATURE: _____

DATE: _____

INVESTIGATOR _____

INVESTIGATOR'S SIGNATURE: _____